GEOGRAPHICAL ANALYSIS OF WASHINGTON COUNTY, MARYLAND, AND ITS FRUIT INDUSTRY

by
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PREFACE AND ACKNOWLEDGMENTS

Washington County, Maryland, was chosen as the subject of this dissertation, in order to achieve an intensive geographic study of a comparatively small region. The principal aim of the study is to investigate the difference in the physical and economic conditions found within the County, and generally between the County and other counties, or the State. The dissertation, in brief, is a study of "regional differentiation".

The problem posed by this study may be stated in form of a question: is areal differentiation brought about chiefly by man or by environmental factors? Research has been carried on, observations and analyses have been made in order to attempt to answer this question for Washington County. The author is of the opinion that, in general, environmental factors, both physical and cultural (social, economic, historical), are the principal influencing factors in any specific area, region, or locality. However, in the case of agricultural differentiation the cultural factors often become secondary. Man plays his part in constructive and destructive ways through his constant attempts to modify the physical landscape and to create a cultural landscape.

Regional differentiation is a result of differences in the environmental factors active in a region. The physical factors are frequently, though not always, very important in influencing the unique characteristics of a region, even though the region may have been profoundly altered by man. Besides, even though it may appear that man is exclusively responsible for

the cultural factors, in many instances these cultural factors may have been, to some extent, conditioned by physical factors.

A brief historical chapter has been added because the author is of the opinion that the present nature and arrangement of things on the earth cannot be fully understood without a comprehension of past economic and cultural processes. Preston E. James in his Geography of Man, p.v, states that in order "to understand the significance of what is observed on the earth today it is necessary to go back to origins and trace developments". The author has also taken the future into consideration, and has tried to formulate some predictions, because he believes that future consequences are closely related to present conditions. The past is important as a background for the present, and the present is important as a basis on which to predict and plan for ultimate aims which are of great concern to humanity everywhere.

The following steps have been taken in the preparation of this dissertation.

1. Library research. This included many types of literature; geographical, historical, economic and sociological, although the major part of the literature was morphological, climatological, statistical, and historical. The author benefited from many publications which are exclusively or in part related to the County, concise reports and bulletins, mostly of a statistical nature.

2. Constant contact was maintained with agencies and individuals throughout the period of preparation. Direct contact was maintained, in particular with the County Agent, Mr. Mark Miller, the horticulturist, Mr. Charles Dunbar, the entomologist, Dr. C. Graham, the Hagerstown Chamber of Commerce, and the Extension Service, University of Maryland. Fruit growers and farmers from the different sections of the County provided much necessary information and aided the writer greatly in acquiring a better understanding of the problems from the producer's point of view.

3. In order to obtain reliable and specific information on a number of points, a comprehensive questionnaire was prepared. It consisted of sixty-six questions, in two parts. The first part was designed to provide general information about the background of the farmers, types of farming and farm activities. The second part pertained only to fruit growing. The questionnaire was filled out by the author during his interview with various fruit growers and farmers. The persons interviewed were selected on a sampling basis.

4. During the preparation period much time was spent in the field by the author. The first few trips were made for general reconnaissance, which furnished a "feeling of the area". The trips that followed, and the weeks spent in residence, gathering material in the field or in the libraries, gave a clear picture of the various physical aspects of the area, and of the economic and social life of the people.

The time was a fruitful period of training and it is the author's hope that the results of his efforts may also prove useful to his fellow geographers, in general, and to Washington County in particular.

In closing, the author would like to express his gratitude to Professor William Van Royen, Head of the Department of Geography,for his fruitful direct supervision. He is also grateful to Mrs. Margaret Battersby, Administrative Assistant, for editing the text. The author wishes to express his great appreciation for the help he has received from Mr. Arthur Karinen throughout the drafting work. Acknowledgement should be extended also to the other members of the staff of the Department for their helpful suggestions. The aid and cooperation of the officials of the Extention Service of the University of Maryland in Washington County and on the campus are highly appreciated. The help extended by fruit growers and farmers of the County is also gratefully acknowledged.

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M.H.A.

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CHAPTER I

INTRODUCTION

Washington County is one of the counties of Western Maryland, and is the longest and, at the same time, the narrowest in the State. In shape it resembles a boot: the heel being at the bend of South Mountain near its northern extremity, the toe at the Potomac River next to Elk Ridge, and the top at Sideling Hill. The County stretches from east to west over a distance of forty-four miles. Its greatest width, from north to south, is about twenty-eight miles in the east, while it is only a little over two miles in the west. The total area is 467.95 square miles, of which 458.47 are land (293,420 acres). Its eastern boundary with Frederick County is formed by the crest of South Mountain, while it is separated from Allegany County to the west by Sideling Hill Creek. On the north it is bordered by Pennsylvania and its southern boundary is formed by the south bank of the Potomac River which runs between the County and the states of Virginia and West Virginia (Plate 9).

The County boundaries follow natural features on three sides and in this respect is different from the other counties of Maryland. Only the northern boundary, a portion of the Mason-Dixon Line, is a straight line border. The eastern boundary is fairly regular, except in its northern portion. The western and southern boundaries are very irregular, following as they do the meanderings of Sideling Hill Creek and the Potomac River, respectively. The irregularity of the

southern boundary is so great that the actual boundary is eighty-three miles long, whereas a straight line would measure only about forty-two miles. The mountain boundaries to east and west are crossed by a few passes while several bridges span the Potomac boundary on the south. To the west, Sideling Hill is a more important obstacle than the insignificant Sideling Hill Creek. The passes were used by the early settlers travelling westward from Eastern Maryland. Streams were crossed at fords before the building of bridges. As a result of the great north bend of the middle Potomac between the mouth of Sideling Hill Creek and McCoys Ferry, the river approaches within less than two miles of the Pennsylvania line at Hancock, leaving a narrow Maryland corridor to connect the western extremity of the state with the main mass of the state to the east. At the same time, due to the fact that it includes part of the Appalachian Valley (Cumberland-Shenandoah Valley), it acts as a bridge oriented in a northeast-southwest direction between Pennsylvania on one side and West Virginia and Virginia on the other side. This position has been an important factor in the development of Hagerstown as an industrial and commercial center, particularly after the town was connected by highways and railroads with other areas, where markets and raw materials are located. Further analysis will be presented in Chapter XII.

CHAPTER II

THE HISTORICAL BACKGROUND

Hagerstown Valley (Antietam Valley)[1], the part of the Great Appalachian Valley that lies within Washington County, was a major route of travel and an excellent hunting ground for the Indians who fought among themselves for hunting rights in the area. The Delaware came from the north and here met the Catawbas who came from the south. The war between these two tribes was almost continuous and often extremely bloody. Two great battles between these tribes took place in the Valley: one at the junction of Antietam Creek and the Potomac River, and the other at the junction of Conococheague Creek and the Potomac. The fords located near these two junctions were major crossing points of the Potomac River in the Valley route. These facts are significant as they reflect the importance of the location and the fertility of the valley portion of the County to the early inhabitants. Indian settlements took the form of small villages scattered along the streams or near springs in order to assure a reliable water supply. The Hagerstown Valley furnished the Indians with excellent hunting grounds, as well as with good fields for the raising of corn. Nevertheless, those restless and wandering Indians left no cultural imprint on the Valley.

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[1] Antietam Valley used in the early time and included what was called later Hagerstown Valley. The word Antietam, likely, is a name of a chief of an Indian tribe, and it was written also in two other forms "Anti-Etam" and "Anteatam." The form used in the text is that of current usage.

They constructed neither stone houses nor bridges; neither monuments nor altars to their gods. Although the physical conditions found in this Valley were favorable for economic and cultural development, the warfare between the Indian tribes helped to make their life rather nomadic and discouraged development of advanced communities.

Prior to early permanent settlement, white people in adjacent areas utilized the Valley for hunting and fishing only. Similar activities, as well as fur trading, were carried on by the first settlers in the area. Thus, their interest did not differ significantly from those of the Indians who had occupied the Valley during the preceding period, and they left equally little imprint upon the land use.

However, the fertility of the soil, the abundant fauna and flora, plus a good water supply, attracted white farmers to Hagerstown Valley in the early part of the eighteenth century. Pioneers from the east, coming across South Mountain settled along Antietam Creek. At the same time, another group of settlements was established along Conococheague Creek by pioneers who came across the Potomac River, from the southwest. When those pioneers began to settle the Valley, the war between the Indian tribes was at its height. The fight between the Indians created terror and fear among the few settlers who settled along the Antietam Creek. Under such conditions, these settlers fled back to South Mountain to be far enough from the battle field, although they were on friendly

terms with the Indians and were not molested by them.[1] There is some disagreement among historians as to which of these two groups of settlements is the older, but the issue is of little significance to this study, especially since the settlers who came from the east did not settle permanently. The first settlement in Hagerstown Valley was made in 1734 at the mouth of Conococheague Creek,[2] where the present Williamsport is located. At the same time, the area along the Antietam Creek was the scene of an Indian war which began in 1730 and ended in 1736 with a battle which took place south of the present Sharpsburg.[3] This first settlement was a mere trading post.

> Not until 1732 was the attention of the Proprietories drawn to this valley; but in that year (1734) Charles Friend and Lord Baltimore offered liberal terms to all who would settle on any of the back lands on the northern and western boundaries of the Province, where it was stated, there were several large tracts of land fit for tillage. /4/

Then those settlers who came from the southwest built houses, formed communities, and began to utilize the land for agriculture. Therefore, it may be said that the development of the County started from the lower Conococheague area. This

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[1] Helen A. Hays, "The Antietam and Its Bridges, the Annals of an Historical Stream," G. P. Putnam's Sons, New York; 1910, p. 7

[2] Thomas J. Williams, "Washington County, Maryland," Maryland Historical Magazine, 1907, 2:347-354

[3] Thomas J. Scharf, "History of Western Maryland, Being a History of Frederick, Montgomery, Carroll, Washington, Allegany, and Garrett Counties," Louis H. Everts, Philadelphia: 1882, Vol. II, p. 986

[4] Thomas J. Williams, op. cit., p. 347

means that the Appalachian Valley, south of the Potomac River, was settled by the white people before that north of the River. Evidently, the South Mountain was the barrier which hindered the westward movement of the settlers in Maryland, while the Blue Ridge did not hinder the westward movement in Virginia. Hagerstown Valley was accessible from the east across South Mountain through only two gaps: Grampton's Gap, located at the southern end of the Mountain, and Turner's Gap, six miles to the north. The latter was mostly used for crossing South Mountain and through it ran the old Western pike. "Through Turner's Gap the first army of regular troops that ever appeared in the present United States marched in 1755."[1]

Charles Friend was the first settler. In 1739, he obtained a grant of 260 acres located at the confluence of the Conococheague Creek and Potomac River, site of the present Williamsport.[2] From this point the settlement proceeded northward and northeastward into the Valley. Other large tracts were granted to Thomas Johnson, a Governor of the State, who with Launcelot Jacques established an iron foundry at Green Spring.[3] Thomas Cresap also took up a tract of land near the present site of Hagerstown.[4] Jonathan Hager, another early settler, acquired a portion of land which he named

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[1] Ibid., p. 348

[2] Hulbert Footner, "Maryland Main and Eastern Shore", Appleton-Century Company Inc., New York; 1942, p. 138

[3] Thomas J. Williams, op. cit., p. 348

[4] Ibid.

Hager's Choice and a subsequent grant, Hager's Second Choice, along Antietam Creek to the northeast of the present day Williamsport.[1] In 1762 he laid out a town which later was named for him, Hagerstown.[2] The site of the present Hagerstown was determined by a group of fine springs. Similar springs were found here and there in the Valley, and around them the early settlements were made. The first settlers of the Valley who came from the south and the southern Marylanders who came across South Mountain were soon followed or joined by German, Scotch, and Irish immigrants who moved down the Valley from Pennsylvania. Thus it appears that Hagerstown Valley was not settled until after adjacent areas of the northeast and southwest had been occupied. In other words, for a time the Maryland portion of the Appalachian Valley constituted a gap in the settlement between the Cumberland and Shenandoah portions of the Valley. One reason for this was the aforementioned South Mountain barrier to penetration from the east. In 1777 a considerable number of settlers arrived in the County from General Burgoyne's army, which had surrendered at Saratoga that year.[3] They were soon assimilated by the population of the area and became, like the others, land-loving and crop-raising people.

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[1] Hulbert Footner, op. cit., p. 138

[2] Originally the town was named as Hager Elizabeth Town or Elizabeth Hager's Town.

[3] Thomas J. Williams, op. cit., p. 350

When the early white settlers moved into Hagerstown Valley peaceful, friendly relations existed between them and the Indians. Consequently, the settlement grew steadily and without interruption, particularly west of Antietam Creek, until 1754. Later, the differences between the French and the English brought about a war with the Indians, the French and Indian War, 1754-63. For many reasons, the Indians were much closer to the French than the English. They felt that the French had tried to understand them, and were more tolerant of their affairs than the English. The French tried to save the Indians from the demoralization of liquor. Besides, the French married Indians and were kind to them. War between the English on one side and the French and Indians on the other, a costly war to the settlers in both blood and wealth, disturbed the course of settlement, but for only a few years.

In 1754 the English lost a battle in Antietam Valley against the Indians, and the latter continued to attack the settlements, burning, scalping, and carrying inhabitants into captivity and were, in turn, hunted like wild beasts. This war and the Indian raids against the settlers in the area hindered movements west of South Mountain for a number of years. In 1756, George Washington, described the situation when the war was at its height.[1] He said, ". . . . the whole settlement of Conococheague in Maryland is fled, and there

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[1] Arts and Letters, Club of Hagerstown, "A Hearthstone History of Washington County", Hagerstown: 1935, p. 18

remains only two families from thence to Frederictown." There were few forts, such as Fort Frederick near Hancock, and few houses which were sturdy enough to serve as forts, for the people who remained. Most of those who had fled to the older settlements for safety were pursued by parties of Indians to within thirty miles from Baltimore.

With the exception of the French and Indian War period, this section of Maryland had no direct trouble with Indians. Thus it was not considered necessary for the settlers to be grouped together near fortified posts, block-houses and in small towns, and so they lived scattered throughout the Valley on isolated farms. Another fact of great significance concerning the early settlements is that almost every colonist who settled in this area was a farmer. In other words, those settlers were the type of colonists who sought permanent living and who desired to make a livelihood out of the soil. There were many small homesteads consisting of from fifty to two hundred acres, although some landowners had a thousand acres and few had more than two thousand acres, but whether the farm was small or large, life on it was much the same.

At first, settlements in the Valley were established along the banks of streams, particularly at their junctions, where they could be assured of a reliable water supply and make use of the fords in crossing the streams for commercial and social contact with other areas before bridges were built. The fords are formed at the stream junctions, because of great alluvium carried by the streams. The very few settlements, such as Williamsport, later developed into small or large towns.

Shortly after these towns were established they became trading centers where agricultural products were exchanged for manufactured goods.

The rich soil of the Valley produced good crops of corn, wheat, barley, and tobacco. Wheat, barley, and corn were used for food and feed, while the tobacco formed a means of exchange for the purchasing of horses, cattle, sheep, equipment, etc., and also for payment of wages, rents, and taxes. At the same time, in order to acquire rifles, ammunition, salt, and other necessities, the settlers had to rely on hunting which in those times was a serious occupation rather than a pleasant diversion.

Until the 1750's, white settlement was mostly confined to the regions east of Conococheague Creek. The area west of the Creek was still in possession of the Indians. For several reasons, this area west of the Conococheague Creek did not attract white settlers till after the French and Indian War. In the first place, life in that area was uncertain, because of possible Indian attacks; secondly, there were not enough pioneers and adventurers to start movements farther westward; and finally, the demand for land was limited even east of the Conococheague, where good cropland could be obtained. After the French and Indian War, however, peace was reestablished in the Valley and there was an influx of settlers from Pennsylvania, Eastern Maryland, Virginia, and what is now West Virginia.

The settlers lived under difficult and hard conditions during the eighteenth and early part of the nineteenth

centuries. Most necessities were produced locally by the settlers. Houses were nothing more than log cabins. Furniture was rough and crude. Settlers had to start their life in the Valley with hard and continuous work to meet their families' needs. Under such conditions the pioneers had no easy life. The few things which could not be produced were brought across the mountain trails by pack-horses. Pack-horses were also used to carry furs to seaports, such as Baltimore. For instance, they had to bring many of their necessities from other areas, particularly from the seaports. It is interesting to note that those settlers used to bring salt from Baltimore, and that it was so costly that a bushel of salt was equal in value to a good cow and a calf. Difficult living conditions and need for workers gave rise to early marriages with little distinction of rank, fortune, and origin. This was the beginning of the mixing of various cultural groups and the early stages in the development of social homogeneity. (See Chapter V for further analysis.)

For more than three quarters of a century since the first settlement of Hagerstown Valley, settlers remained cut off, to a great extent, from the East Coast and the posts of the West. They also found themselves in a cradle between the mountains, whose ranges to the west and east they somewhat inconsistently called the North and South Mountains. The ways of communication were trails which ran through passes eastward and westward and used the fords as crossing points southward. In September 1796, for the first time, a number of citizens of

Hagerstown held a meeting at the court-house to discuss the utility of a road which would connect the county-seat with Baltimore. They stated the significance of such a road to the people of Washington County by saying[1]

> While agricultural prosperity depends on good markets and the best prices for the produce of the land, the interest of the citizens demand that every possible avenue of communication with the seaport towns, by land or by water, be opened, and that intercourse with them should be as cheap, easy and convenient as possible.
>
> The resolutions further declared that . . . . to provide such a road to Baltimore Town as would enable the farmers to make use of the season of the year in which they were unable to work upon their farms for the transportation of their produce to market.

The act was passed by the State Assembly in March, 1797 to build a road from Baltimore through Frederick to Hagerstown. In 1815, building of this road (National Road) began from Boonsboro eastward, passing through Turner's Gap (1,000 feet high) on South Mountain. This part of the National Road is called Frederick-Boonsboro Road (Plate 9). Between 1818 and 1820, the road from Hagerstown to Conococheague, was built, and from Conococheague westward, the construction was completed a few years later.[2] This part of the Road, after crossing the Conococheague Creek on an initial bridge which set the standard for those which were built later, extended westward passing through the town of Clear Spring, thence

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[1] Thomas J. Scharf, op. cit., p. 995

[2] Ibid., p. 997

southwestward running along the northern foothills of Boyd Mountain and crossing Fairview Mountain at its southern end through a gap (1,000 feet), to Indian Spring. From this town to Hancock, the Road was built almost parallel to the Potomac River, mostly on the River terraces. From Hancock westward, the Road was constructed over rather rugged terrain in which it crossed Tonoloway Ridge through a gap (elevation 700 feet) and Sideling Hill through a relatively minor gap (1,500 feet).[1] In 1822, the construction started to complete the Road between Boonsboro and Hagerstown.[2] Another road was built between 1812 and 1816 to connect Hagerstown with Westminster. Many other roads were built to connect Hagerstown with various towns in the County such as Williamsport, Sharpsburg, and Smithsburg, as well as with the adjacent counties. These roads are shown in "An Illustrated Atlas of Washington County, Maryland."

At the end of the first quarter of the nineteenth century, Hagerstown became a center well served by the National Road (Route U. S. 40). Thus, the line of travel from the seaboard to the West was completed and lead through Hagerstown Valley which had been isolated for so long; it became the "long dreamed-of highway to the back-country."[3] Mr. Williams, in

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[1] Lake Griffing & Stevenson, "An Illustrated Atlas of Washington County, Maryland", H. J. Toudy, Philadelphia; 1877, Maps of Clear Spring, Indian Spring and Hancock Districts, pp. 8-13

[2] Thomas J. Scharf, loc. cit.

[3] Helen A. Hays, op. cit., p. 22

regard to the National Road and its effect, says[1]

> Before the introduction of railroad, the great Western pikes, passing through Turner's Gap, might have been called the Appian Way of America. Along this road, passing through fertile valleys, through wild defiles, and over mountain ridges, there poured a never ceasing stream of busy life. There were droves of cattle, swine, and sheep from the blue grass of Kentucky, going through the shambles of Baltimore and Philadelphia.

Railroad building in this area started shortly after that of the highways. In 1837, Cumberland Valley Division (Pennsylvania Railroad) which extended from Harrisburg, Pennsylvania, passing through Hagerstown to Martinsburg, Virginia, was completed. Washington County Branch of the Baltimore & Ohio Railroad carried the first shipment from Hagerstown in 1867. A Western Maryland Railroad train entered Hagerstown for the first time in 1873, connecting Baltimore with Western Maryland. In 1880, a Norfolk and Western Shenandoah Railroad train brought the first shipment from Virginia to Hagerstown.

Building such roads and railroads affected Washington County directly and indirectly. The indirect effects were mentioned in the previous quotations. The direct effects: First, there was influx of money into the area from various sources, such as the state budget and the transportation companies. This influx stimulated, as usual, new economic activities and created prosperous business. Second, work on the roads drew labor from neighboring areas, and many of those workers settled permanently.

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[1]Thomas J. Williams, op. cit., p. 353

On September 6, 1776, Washington County was created by Provincial Convention of Maryland. Prior to that time it had been part of Frederick County, which was formed in 1748, and included the present counties of Frederick, Washington, Allegany, and Garrett. In 1789, a new county, Allegany, was created out of Washington County, with Sideling Hill Creek marking the boundary between the two counties.

The development of Washington County between the first settlement, 1734, and the early part of the nineteenth century, was rather slow and confined to Hagerstown Valley, but the building of roads and railroads from 1820 onwards stimulated the agricultural, commercial, and industrial development upon which the present economic life of the County is based.

The following chapter will present the physical features of the land of Washington County, in order to reveal a major factor in the economic activities of the people.

CHAPTER III

THE LAND

The topographic map of Washington County (Plate 9) shows distinctly the three major morphological regions of the County and their minor divisions. The three regions are:

1. The Eastern Highlands Region
2. The Hagerstown Valley Region
3. The Western Highlands Region

The Eastern Highlands Region extends along the eastern boundary from the Potomac River on the south to the Pennsylvania line on the north, and is the longest, narrowest, and smallest of the three regions, including only one-tenth of the total area of the County. The 800-foot contour line may be taken as the western limit of the Eastern Highlands Region. West of this line lies a comparatively low area with elevations of 400 to 700 feet above sea level, while to the east altitudes increase sharply. Within the Eastern Highlands Region, the maximum relief is 1,870 feet, between the highest point, Quirauk Mountain (2,145 feet), and the lowest at Sandy Hook (275 feet). This relief is also the greatest in the County. The minor divisions within this Region are: South Mountain and Elk Ridge, with Pleasant Valley between the two.

South Mountain begins south of Carlisle, Pennsylvania, crosses Maryland, and continues southward into Virginia and beyond. In Washington County, South Mountain is twenty-nine miles long and its width varies from two miles in the north to less than a half mile in the south. The crestline, which

coincides with the boundary line in the south, is 1,200 feet high, and rises to 2,100 feet in the north where it lies almost one mile west of the boundary line. The unevenness of the crestline and the isolated heights, such as Pine Knob and Buzzard Knob, are due to depressions and elevations in the anticlinal axis of South Mountain. In general, the slopes of this Mountain are steeper in the southern part, 30 to 45 per cent, than in the northern part, about 15 per cent. Thus, forest covers most of the slopes in the south but in the north is confined to the higher portions of the slopes. Here, the slopes are used mainly for crops, such as fruits and small grains in Ringgold, Cavetown, Chewsville, Beaver Creek, and Boonsboro Districts, although in Rohrersville and Sandy Hook the cropland extends to the bottom of the slope.

Although there are eighteen crossings over the South Mountain, only five of them are major gaps: Crampton's Gap (900 feet above sea level) and Fox's Gap (1,100 feet) in Rohrersville District; Turner's Gap (1,000 feet) in Boonsboro District; and Warner Gap (1,300 feet) and Harman Gap (1,000 feet) in Cavetown District. The roads approach these gaps through streams valleys, as at Warner's or by a gradual ascent and a series of road cuts, as in the other gaps. In the first case, the road runs directly and almost straight to the gap, while in the second, the road enters the gap at an angle.

South of Trego (Rohrersville District), Elk Ridge begins, which is almost eight miles long and less than a mile wide. It continues southward to the Potomac River, and becomes the Blue Ridge beyond the River. The average height of Elk Ridge

is 1,400 feet above sea level, but this elevation decreases to 900 feet in the north. Most of the Ridge stands 600 feet above the surrounding area, but in the north it is only about 100 feet higher than the adjacent areas. The eastern slope of the Ridge, in general, is steeper, 40 per cent, than the western slope, 25 per cent. The upper parts of the slopes above about 1,000 feet are forested, because of the steepness of the land and shallow soils. Because there are few gaps and the Ridge is short, roads were built along the foothills and around both ends, except for a secondary road which runs from east to west through a pass, 1,200 feet high.

Pleasant Valley, between Elk Ridge and South Mountain, maintains an elevation of 500 to 700 feet above sea level. It is the only significant valley in the Eastern Highlands Region, being six miles long and one and a half miles wide (see Plate 1). The Valley is used predominantly for pasture land and for grain production.

The Eastern Highlands Region is drained by several small streams which flow toward the west and southwest to empty into Antietam Creek. The largest streams are: Little Antietam Creek, Beaver Creek, and Little Beaver Creek. Israel Creek drains Pleasant Valley and flows into the Potomac River west of Weverton. The use of these streams is extremely limited.

In the Eastern Highlands Region, the ground-water emerges in numerous springs, at contacts of shale and sandstone along the slopes of the ridges. Most of the towns, such as Boonsboro and Smithsburg, obtain their water supply from

Plate 1

Hypsometric Map

WASHINGTON COUNTY, MARYLAND

PLATE I

HYPSOMETRIC MAP

SHOWING ELEVATION OF MAJOR PARTS AND THEIR DIVISIONS

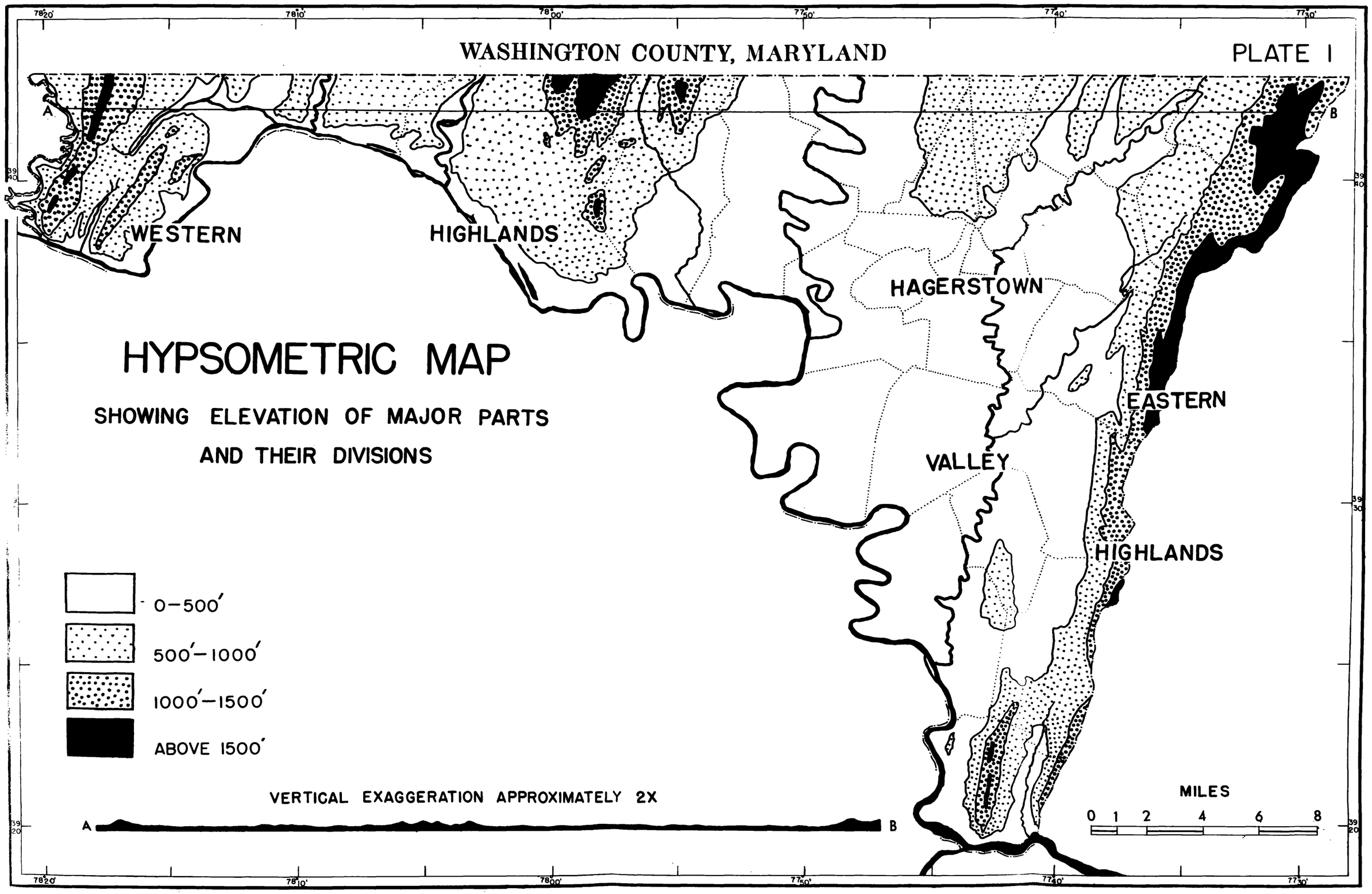

Plate 2

Soil Series

WASHINGTON COUNTY, MARYLAND

PLATE 2

78°20' 78°10' 78°00' 77°50' 77°40' 77°30'

39°40' 39°30' 39°20'

SOIL SERIES

- HAGERSTOWN SERIES
- FRANKSTOWN SERIES
- MURRILL SERIES
- POPE SERIES
- DEKALB SERIES
- ELK AND HOLSTON SERIES
- DUNNING AND HUNTINGTON SERIES
- CLARKSVILLE SERIES
- BERKS SERIES
- PORTERS AND ASHE SERIES
- HANCEVILLE SERIES
- UPSHUR SERIES
- ROUGH STONY LAND

MILES

0 1 2 4 6 8

springs. In many places, comparatively shallow wells are sufficient for farms and isolated homes. ". . . . in this area over 80 per cent of the wells are less than 100 feet deep."[1]

Along the summits of both Elk Ridge and South Mountain occur patches of soils belonging to the Hanceville Series and patches of Rough Stony Land. Both in the northern and southern parts of the South Mountain area,the upper slopes are covered mainly with soils of the Porters and Ashe Series, while in the central area soils of the Dekalb Series occur (Plate 2). Along the foothills, from the Pennsylvania line to Rohrersville, the Murrill Series predominates. Dekalb Series predominates on Elk Ridge, in particular on its western slope. Ashe and Porters Series are developed in Pleasant Valley with the Ashe Stony loam and Ashe gravelly loam the predominant soils.

Due to erosion, the soils of these series are shallow on the steeper slopes. They become much deeper, 8 to 12 inches, in the foothills and in the valleys where erosion is less rapid. Here, they are much richer and consequently can support the production of various crops, such as fruit, wheat, barley, rye, and clover.

Soils of Porters and Ashe Series occupy one-fourth of the Eastern Highlands Region and include Porters silt loam, Ashe

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[1]State of Maryland, Department of Geology, Mines and Water Resources, "The Physical Features of Washington County", Waverly Press Inc., Baltimore; 1951, p. 185

Photo I. Approaching South Mountain from the west, along U. S. 40. The Hagerstown Valley Region is in the foreground.

stony loam, and Ashe gravelly loam. These soils are 6 to 12 inches deep, well-drained, medium-textured, moderately acid, permeable, but susceptible to erosion. They have a low to medium available moisture capacity and a fair amount of inherent fertility.[1] In most sections, these soils are under cultivation, elsewhere they support growth of hardwoods.[2] The characteristics of the soils of the Murrill Series--Murrill gravelly loam and Murrill silt loam--are similar to those of the Porters and Ashe Series, except that they are deeper, 10 to 18 inches, and somewhat less acid. Soils of the Murrill Series have been utilized for production of fruit and grain, and for pasture land. However, these soils cover only a small portion of the Eastern Highlands Region. The Dekalb Series includes soils such as Dekalb shale loam and Dekalb gravelly loam, and extends over more than one-half of the Region. These soils are moderately deep, 6 to 10 inches, and are of comparatively little importance insofar as agriculture is concerned. The Hanceville Series covers a small portion of the Eastern Highlands Region, and includes the Hanceville gravelly loam. Nearly all of this soil is under cultivation. It is used mainly for growing corn, wheat, and hay. The Hanceville Series soils are shallow, with a low available moisture capacity, and are of moderate fertility. The Rough Stony Land

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[1] Ibid., p. 228

[2] U. S. Department of Agriculture, Bureau of Soils, "Soil Survey of Washington County, Maryland", Government Printing Office, Washington, D. C.: 1919, pp. 32-36

has very little significance for agriculture. It includes soils which are stony, shallow, with low moisture capacity and of low fertility. "Rough stony land represents a condition rather than a soil type. It embraces . . . . rough, broken, and steep areas of nonagricultural land . . . . ."[1]

The Hagerstown Valley Region or Antiteam Valley is part of the great Appalachian Valley. It is a continuation of the Cumberland Valley of Pennsylvania, but to the south is separated from the Shenandoah Valley by the Potomac River. The Hagerstown Valley Region is a broad depression lying between the foothills of South Mountain to the east and Boyd, Johnson, and Powell mountains to the west. Its width--from east to west--is from twenty to twenty-three miles and its length--from north to south--varies from eight miles in the west to twenty-eight miles along the eastern margin. The Region occupies over three-fifths of the total area of the County.

In general, the elevation of Hagerstown Valley ranges from 400 feet along the Potomac River to 600 feet around the town of Leitersburg. Thus, there is a slight and continuous increase in elevation from south-southwest to the north-northeast of the Valley, at the rate of 15 feet per mile. Relief is comparatively low, with the flood plains of the streams lying only from 50 to 100 feet below the general valley level. Most of Hagerstown Valley Region is enclosed within the

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[1] Ibid., p. 44

500-foot contour. The difference in elevation between this Region and the Eastern and Western Highlands Regions is shown on Plate 1 and the cross-section. Hagerstown Valley Region is not a single hydrographic basin, for Antietam Creek drains the major portion of it on the east, while Conococheague Creek drains the western part.

Hagerstown Valley Region is generally underlain by limestones belonging to different formations, such as the Tomstown, Waynesboro, Elbrook, Conococheague, and Beekmanton. Its minor land forms, ridges and valleys, are influenced by the nature, thickness and position of these formations.

The Martinsburg shale formation occupies a belt which extends from Williamsport northward to the State line, with an average width of two miles. This formation furnishes clay for a bricksplant at Williamsport. The area underlain by the Martinsburg shale has a topography which is different from that of adjacent parts of the Valley. The meanders of Conococheague which are both elaborate and regular are ". . .. restricted to a narrow zone which coincides very closely with the boundaries of the Martinsburg shale against the Chambersburg limestone."[1]

The Tomstown formation is continuous from the Potomac River to the Pennsylvania line as a broad belt of irregular width. It is composed largely of dolomite and limestone which locally have been used for the manufacturing of lime. Marble

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[1] State of Maryland, Department of Geology, Mines and Water Resources, op. cit., p. 11

Photo 2. Typical landscape of gently undulating land in Funkstown District, the central part of Hagerstown Valley Region.

Photo 3. Land form of Leitersburg District. Note the minor morphological features and the increase in elevation toward the right background (northeast of Hagerstown Valley Region)

beds are common in this limestone, and have been quarried in the past. The Waynesboro formation extends from the Potomac River at Antietam to the State line south of Waynesboro, except for a small interruption near Beaver Creek. Many narrow ridges occur in this formation. Such ridge offer favorable sites for peach orchards. The limestones of the Waynesboro formation have never been quarried. The Elbrook formation occurs in two belts: one lies at the foot of South Mountain and the other along the west side of Hagerstown Valley, where it is faulted against Martinsburg shale. No ridges or valleys of substantial size are found in this formation. Finally, the Antietam sandstone forms a broad, long hill (Short Hill, 1,100 feet high) north of Boonsboro and east of Mt. Pleasant.

The flatness of Hagerstown Valley Region is interrupted by low limestone ridges which run according to the strike of the formations, generally parallel to South Mountain. South of Hagerstown and west of Antietam Creek, the area has few distinct ridges or pronounced valleys. Nowhere in this part of Hagerstown Valley does the elevation exceed 500 feet. Marsh Run drains most of this area, and its wide, open valley is the most distinctive feature of this part of the Valley. In many localities in Hagerstown Valley there are numerous outcrops of limestone, while other sections have only a thin soil cover. Such patches are not cultivable and are usually left in woods or wooded pastures. In Chewsville and Leitersburg Districts and west of the foothill of South Mountain in Beaver Creek, Cavetown, and Ringgold Districts, the ridges become

more prominent and reach heights of 200 to 300 feet above the general Valley floor. Here the long and narrow valleys have been deepened by the numerous small streams. A similar morphology is found along the western margin of the Valley.

Economically, the limestone in Hagerstown Valley is of great value. It is largely responsible for the rich soils of much of the Valley. It is quarried for the manufacture of lime for agricultural purposes or, as crushed rock, it is used for road building. Consequently, it can be said that the various limestones give Hagerstown Valley diversity in land forms, soils, and land use.

Hagerstown Valley is within the drainage basin of the Potomac River, Antietam Creek, Conococheague Creek, and a few minor streams all being tributaries to this River. Most of these streams are sluggish and wide, because of the low gradient of their valleys. These streams flow southward or south-southwestward from their headquarters in Pennsylvania or in Washington County. Streams are characterized by soft muddy banks and numerous small islands, because of the high silt content of the water and the slow currents. The many dry valleys found throughout Hagerstown Valley indicate the extent of underground drainage due to the nature of the limestone bedrock.

The valleys of the Potomac River, Antietam Creek, and Conococheague Creek are entrenched 50-100 feet into the Valley floor, for the area was uplifted after the formation of the Harrisburg peneplain. Terraces, which vary in height and in

width, have been left along these streams. The flood plains usually are a few feet above low-water level, and from a few yards to several hundred yards wide. These areas consist of marshy, water-logged alluvial land, mostly uncultivated and covered with woods. There are numerous terraces at about 50 feet above river level, and others at about 100 feet. Particularly along the Potomac River, these terraces may be as much as a mile wide. They are generally used for growing grains and pastures. These terraces indicate that the area has been subject to an uplift, and that the present features of the Valley are younger than the streams.

Due to the low gradients, the streams are very meandering. For instance, Conococheague Creek is twenty-two miles long from the point where it enters the County to its mouth at Williamsport, air distance of less than nine miles. The meanders of Antietam Creek are smaller than those of Conococheague Creek, more irregular, sharper, and deeply entrenched. Such differences are closely related to the hardness of the bedrock. Meanders tend to be smaller in areas of hard bedrock, and they become more elaborate in broad outcrops of soft rock. Limestone, in general, is more resistent to corrosion than shale. The meander belt of Conococheague Creek coincides very closely with the outcrop of the Martinsburg shale and does not enter the limestones on either side. Three of the curves on the west touch the limestone at Hicksville, between Hicksville and Wilson, and at Wilson. Where the meanders touch the limestone, the banks of the stream

are 30 to 50 feet higher than within the shale belt. Within the shale belt, however, the meanders of Conococheague Creek have created considerable local relief. The meanders of Antietam Creek are entirely in limestone formations; thus no differential erosion has taken place here.

In the County, Antietam Creek assembles the water of several streams; Beaver Creek and Little Antietam Creek are the major tributaries on the left, and on the right Antietam Creek has many small unnamed tributaries. Beaver Creek, the most important tributary, flows southwestward from the mountains and is joined by Little Beaver Creek west of Benevola. It drains a tract more than thirteen miles long and carries a considerable volume of water to Antietam Creek which it joins at a point three miles north of Keedysville. Little Antietam Creek is a short stream which rises from several sources in the limestone hills northeast of Rohrersville, turns northwestward, passes Keedysville and empties into Antietam Creek. The drainage patterns of these streams have sometimes been affected by the trend and the location of formations and the hardness of the bedrock. For instance, the Little Antietam Creek, from its headwaters, flows north-northwestward rather than south-southwestward, which is the general trend of the slope of the Valley floor, because of the occurrence of a minor ridge-forming rock, the Antietam quartzite, which is responsible for Antietam Ridge.

Conococheague Creek displays the most scenic meanders in Hagerstown Valley. It enters Washington County in Conococheague District in which it maintains meanders similar to those it has in Pennsylvania. The Creek passes Wilson in Wilson District,

thence it turns south-southeastward in relatively small meanders and empties into the Potomac River, north of Williamsport. It is abundantly supplied by short streams from both sides at intervals of approximately two miles.

Several small streams such as Toms Run in Clear Spring District and Marsh Run in Tilghmanton District drain the lower part of Hagerstown Valley and empty directly into the Potomac River. Their courses show comparatively small meanders.

The Potomac River, after passing through the Western Highlands, enters Hagerstown Valley at McCoys Ferry. Along the south side of the Valley, the River presents rather large and complicated meanders. The course of the River has been affected at some points by the hardness of certain formations. For instance, from Williamsport southward, the River flows along the eastern boundary of the Martinsburg shale; it then turns westward, crosses the shale belt and meets the limestone to the west of the shale belt at Falling Waters (Downsville District), where it turns southeastward. South of the junction of the Antietam, the River flows to the southeast until it touches Mountain Lock, then turns westward. At Dargan the River changes its course again and assumes a southeast direction. Not being able to cut through Elk Ridge, it turns back westward once again and finally succeeds at Harpers Ferry to cut through Elk Ridge and South Mountain in a steep-walled gorge.

The ground water is of great significance in Hagerstown Valley for domestic and industrial usage. The water-table in

the Valley is higher in the center--approximately 500 feet above sea-level--than it is around the Antietam and Conococheague valleys, where it lies at 400-450 feet above sea level. It is lowest in the southern part of Tilghmanton District, 320 feet, and highest, 680 feet, in the section four miles north of Hagerstown.[1] Springs are not so important a source of water in Hagerstown Valley as in the Eastern Highlands and Western Highlands regions. Hagerstown uses purified Potomac River water, because the great demand for water by the industries and people of the city cannot be supplied by the nearby springs and streams.

As Hagerstown Valley is underlain mostly by limestones, a substantial amount of the precipitation can penetrate to the ground water. Much of the water supply, for domestic and commercial usage, in the Valley is supplied by wells drilled to depths varying from over a hundred to almost a thousand feet. The yield of these wells ranges from one gallon to two hundred gallons per minute. The depth and flow of a well depend upon the nature of the underlying rock. If it is solid limestone, the well must be drilled deeper and the supply of water will be less abundant than if the well is drilled through cavities and fractures. Depths of wells are small when drilling reaches a cavity or fracture close to the ground surface.

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[1] Ibid., p. 180

Plate 2 shows that the soils of Hagerstown Valley belong mainly to the Hagerstown Series, but these soils are interrupted by stripe-like patches of soils of the Dunning and Huntington Series. The Frankstown Series covers a substantial portion of Sharpsburg District and small areas in the Funkstown and Downsville districts. The Berks Series predominates in the Conococheague Creek Valley, and the Murrill Series occupies the western end of the Valley. Other series such as the Pope, Elk, and Holston Series are found in small, isolated areas.

The Hagerstown Series include several soil groups and many types of soils developed from limestones which are deep, well-drained, medium to heavy textured, slightly acid, and moderately permeable. They have a high available moisture capacity and high fertility. These soils are: Hagerstown stony loam, Hagerstown silt loam, Hagerstown clay loam, etc. They have developed on such limestone formations as the Beekmanton, Stones River, Conococheague, and Tomstown, and are found mostly in areas with less than eight per cent slope. Although they are comparatively deep, 8 to 15 inches, and are seldom left bare through the winter, the new methods of farming which result in deep tillage make measures for controlling erosion rather difficult. Hagerstown silt loam is the most extensive and most important soil type of the County. It extends, with some interruptions, from South Mountain to the shale belt of the Conococheague Valley, and covers almost one-third of the total are of the County. This soil is mostly

under cultivation. Hagerstown silt loam constitutes the most desirable farm land in the County, with a cash value as high as $600 an acre.

In general, the soils of the Hagerstown Series are exceptionally well farmed, for they are highly productive. Their use is confined to growing grains and pasture crops, except where limestone outcrops make tillage diffucult. Thus, most of the dairy farms are located on these soils. Parches with rock outcrops (stony fields) are left in hardwoods or wooded pastures. Limestone areas in the Eastern and Western Highlands are utilized principally for fruit trees, although most of the soils are shallow.

The Frankstown soils have developed on limestone formations interbedded with sandstones and shales and include Frankstown cherty silt loam and Frankstown stony loam. These soils are less suitable for dairy and general farming than those of the Hagerstown Series. They are not as deep but are more easy to cultivate than the soils of the Hagerstown Series. The Dunning and Huntington Series consist of several types of soils such as Dunning silty clay loam, Huntington gravelly loam, and Huntington silt loam. These soils generally occur on flood plains in limestone areas (see Plate 2). They are fairly deep, 10 to 14 inches, and, since they have a surface which is generally flat or slopes only gently toward the streams, are poorly drained. These soils are composed of alluvial deposits brought by streams from limestone areas, and have high available moisture capacity and fertility. These qualities made them better suited for corn and pasture than for wheat, barley,

or rye. They are difficult to cultivate, particularly when too wet or too dry. However, as they are subject to flooding, farm land in the areas of these soils is of low value.

The Western Highlands region occupies the part of the County which extends from the western limit of Hagerstown Valley to Sideling Hill Creek. It includes the western portion of Clear Spring, Indian Spring, and Hancock Districts, almost three-tenths of the total area of the County. The Western Highlands are part of the Ridge and Valley Province of the Appalachian Mountain area. The Appalachian Mountains extend toward the north in Pennsylvania, westward into Allegany County, and beyond the Potomac River into West Virginia.

Structurally, the Western Highlands region shows a close correlation between the distribution of hard rocks and the principal surface features. The Schooley peneplain, which represents the result of prolonged period of erosion after the Appalachian folding, was gradually uplifted. As a result, the streams dissected the peneplain and left the harder rocks, namely the sandstones, to form the ridges. Thus, the difference in hardness of rocks and their resistance to weathering and erosion are the most important factors in determining the present morphological features of this Region. The ridge-making rocks today are: the Tuscarora sandstone in the Bear Pond Mountains, the Oriskany sandstone in Elbow Ridge and Tonoloway Ridge, and the Purslane sandstone in Sideling Hill. Shales and limestones were eroded by streams and formed the

lower parts of the present terrain.[1]

Westward from Hagerstown Valley, the elevation increases abruptly from 700 feet to 1300 feet in the north and to 900 feet in the south. Powell, Johnson, and Boyd Mountains form the eastern edge of Western Highlands. Powell (1300 feet) and Boyd (1000 feet) are erosional remnants of a ridge, and are separated from the mountains on the west by valleys which are around 700-800 feet above sea level.[2] To the west of Powell Mountain, Rickard Mountain[3] (1400) extends northward into Pennsylvania and is separated from Gillians Knob by the valley of Little Conococheague Creek. The southern end of Rickard Mountain is narrow and has a gentle slope, 15 per cent; its western slope is 30 per cent; and its eastern slope 45 per cent. Gillians Knob (1600 feet) is located south of Blair Valley and is separated from Sword Mountain by Stone Cabin Gap (900 feet high). Stone Cabin Road runs through the valley of Little Conococheague Creek between Powell Mountain and Johnson Mountain, then it follows the foothills of Gillians Knob to the Gap, thence southwestward and southward to Indian Spring, leaving the Fairview mountainous area to the east. This road is a typical example of how the topographic features determine the trend of roads and railroads in the Western Highlands region. Fairview Mountain has moderately

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[1] Ibid., pp. 13-16

[2] Powell Mountain is called North Mountain East Range in "An Illustrated Atlas of Washington County."

[3] It is called North Mountain in the above Atlas.

Photo 4. Morphological features of the Western Highlands Region. Note Tonoloway Ridge in the left background.

steep slopes, 30 per cent, and a broad summit area. Its crestline is around 1400 feet high, except at a point about one mile north of Route U. S. 40, where the altitude of the Mountain reaches 1700 feet above sea level. Fairview Mountain slopes gently at its southern end, 15 per cent. Route U. S. 40 runs along the northern and northwestern slopes of Boyd Mountain, then ascends Fairview Mountain in a northeast-southwest direction to avoid the highest part and pass over the Mountain through a cut (975 feet above sea level), from which one can see views of four states: Maryland, Pennsylvania, Virginia, and West Virginia. Sword Mountain (1400 feet) is the western limb of the Fairview Mountain anticline. It is narrow and has steep slopes, 60 per cent, because the strata are almost vertical. Hearthstone Mountain, the highest, widest, and most complex mountain in the Western Highlands region, has rather a wide summit area with a maximum elevation of 2000 feet. Bear Pond Hollow (1100 feet high) separates Sword Mountain from Hearthstone Mountain.

The area west and south of these mountains has a comparatively low elevation, 500-700 feet above sea level. It consists of a great many ridges and valleys. In this area sandstone supports the ridges while shales and limestones underlie the valleys. The northern part of the area from Bear Pond Mountains to Licking Creek is occupied by two "Indian Spring" Demonstration Areas, and the southern part is in farm land.

Pigskin Ridge and Elbow Ridge occupy the western part of Indian Spring District. Both are about 900 feet high and have gentle slopes, 10-15 per cent. The slopes of Pigskin Ridge

are dissected by many small streams from which several flow eastward and join Licking Creek. West of these two ridges the area is highly dissected by numerous small streams and has an elevation of less than 700 feet. Timber Ridge and Cove Ridge, which extend northward from the Potomac River into Pennsylvania, are comparatively low (800 feet) and narrow (half a mile). Great Tonoloway Creek flows from Pennsylvania along the western side of Tember Ridge and joins the Potomac River at a point one mile east of Hancock. Route U. S. 522 runs southward along the western slope of Cove Ridge and crosses the Potomac River at Hancock. The elevation of the area from Cove Ridge to Round Top and Tonoloway Ridge is low, less than 700 feet above sea level. Many streams have cut through the land, forming rather small ridges and short valleys.

Round Top (1100 feet) is located west of the Potomac River bend. The southern slopes of the mountain are rather gentle, 10-15 per cent, while the slopes on the other sides are much steeper, up to 60 per cent. Tonoloway Ridge, two and a half miles west of Hancock, is the longest ridge in the Western Highlands region. It extends in a southwest-northeast direction, from the Potomac River, through the County and into Pennsylvania. Across the Potomac River, the Ridge has its continuation in West Virginia. Mainly the Oriskany sandstone forms the backbone of this ridge. Tonoloway Creek crosses the Ridge through a deep gorge, 500 feet below the crestline. Half a mile south of this gorge, there is a minor pass through which the National Road (U. S. 40) extends

westward. The Western Maryland Railroad, the Chesapeake and Ohio Canal and a road cross the Ridge through a gorge and run on the lower terrace of the Potomac River. The crestline of Tonoloway Ridge increases in height from 900 feet in the north to 1200 feet in the south. The slopes of the Ridge are steeper in the southern part, 40 per cent, decreasing toward the north to a 30 per cent slope.

The area from Tonoloway Ridge westward to Sideling Hill is part of the Harrisburg peneplain. The average elevation of this plain is more than 800 feet above sea level here compared to less than 700 feet near Hancock and to 500 feet in Hagerstown Valley. This area is dissected by several longitudinal small streams which drain its southern part, while Little Tonoloway Creek and its tributaries drain the rest.

Sideling Hill is the most western ridge of the Western Highlands region. It extends northeastward from the Potomac River through the County and into Pennsylvania. The Ridge, like Tonoloway Ridge, is composed of sandstone. It is wider and slightly higher on both ends than in the middle, where the crossing point of U. S. 40 is located. The highest point (1635 feet above sea level) of the crestline is located one mile north of the Potomac River. The steepness of the slopes is greater, 60 per cent, in the southern part of the Ridge than in the northern part, 30 per cent. Most of the southern half of the Ridge is part of the Washington County Game Farm.

The area to the west of Sideling Hill is characterized by comparatively low elevations (700-900 feet above sea level), gentle slopes, 8 per cent, and numerous small streams. All

the streams are tributaries of Sideling Hill Creek which marks the western limit of Washington County.

The Potomac River enters the Western Highlands region at its confluence with Sideling Hill Creek at an elevation of 500 feet and leaves the Region on the east at McCoys Ferry, where the elevation is 350 feet above sea level. The gradient of the river is much greater (6 feet per mile) in this part of the Counth than in the other two regions, for the River leaves the County farther east at 260 feet above sea level. Where it crosses Sideling Hill the Potomac River passes in a straight course through a gorge, almost one mile wide. After passing through another gorge, the River changes its course from a west-east to a southwest-northeast trend, to avoid Cacapon Mountain, West Virginia. At Hancock, the River reaches its northermost point in the County. From Hancock on, the River runs in a general southeast direction without meanders. The course of the Potomac has been determined by the structure and the extent of the rock formations, having cut through the soft formations and avoided the harder ones. In the Western Highlands region, the Potomac is fed by numerous tributaries from both sides, such as Sideling Hill Creek, Great Tonoloway Creek, and Licking Creek on the north and Sleepy Creek and Back Creek on the South (Plate 9). Thus, the volume of the River gradually increases. In this region, the River is characterized by a wide valley, numerous islands, and wide terraces. The tributaries originating in the Western Highlands are short, and have rather flashy run off, because

of their comparatively steep gradients. Since the Region is not industrial, the use of the streams is extremely limited.

Many of the wells in this Region are shallow, mostly less than 100 feet in depth. The level of the ground-water here is rather high, due to the wide distribution of shale and sandstone formations. A few small areas have thin limestone beds. Domestic water supply is obtained primarily from springs and wells.

Soils of the Western Highlands region are rather poor and shallow, because they were developed chiefly from shales and sandstones and on steep slopes. Plate 2, which is based upon the Soil Map of Washington County (1919), shows a great diversity of soils in this region. Soils of the Berks Series are predominant, followed by Upshur, Elk and Holston, and Hanceville Series.

The Berks Series include Berks shale loam, Berks gravelly loam, and Berks silt loam. These soils, developed on shales, are shallow to moderately deep, 6 to 12 inches, and easily tilled. They occupy undulating areas where use of agricultural machinery is feasible, and are used for grain production and pasture. Farm land having these types of soils has a rather low cash value. The Upshur Series consists of Upshur gravelly loam which is developed on shale and sandstone, and is ordinarily shallow, with a depth of 6 to 10 inches. It is limited to the western part of the Region,mainly on Sideling Hill, Tonoloway Ridge, and Round Top. Thus it is shallow, has extensive drainage and is subject to erosion. Most of the

land of this soil is forested; only about one-fifth is cultivated. Other series have been described in the discussion of the other regions.

Washington County consists of three topographic regions. The largest, more than one-half of the total area, is Hagerstown Valley, which includes undulating land made up of several limestone formations. Many minor ridges and valleys are found. Almost four-fifths of the fertile Hagerstown Valley is in crops. The second largest region is the Western Highlands. Although 70 per cent of its area (77 per cent for the County as a whole) could be cultivated, less than one-third of the Region is in cropland, because a substantial part of it is in steep slopes, subject to excessive erosion, and has poor soils. The Eastern Highlands includes a major ridge, South Mountain, an important valley, Pleasant Valley, and a comparatively small ridge, Elk Ridge. One-half of the area of South Mountain and ninety per cent of the area of Pleasant Valley are cultivable.

Climate, the other physical factor, will be presented in the following chapter.

CHAPTER IV

THE CLIMATE

The weather and climate of Washington County are determined largely by air masses which acquired their characteristics in distant areas, by its latitudinal location and its distance from the Atlantic Ocean. Local modifications of the climate are due to the terrain features of the County.

Most of the data[1] used in preparing this Chapter were made at eight stations. Four of these: Chewsville, Clear Spring, Hancock, and Keedysville have the longest and most complete records. These records have been used for Plate 3 and further details pertaining to these stations are given in Table 1 and in Appendix B. Climatological data are collected at other stations: Edgemont, Green Spring Furnace, Tonoloway, and Williamsport, but the records for these stations are incomplete and brief. For instance, for Edgemont and Williamsport only precipitation data are available since 1938. As Green Spring Furnace and Tonoloway have comparatively long though incomplete records, they were included in Table 1.

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[1] Sources of such data are:

1. Climatic Summary of the United States. U. S. Department of Commerce, Weather Bureau. Section 51--Potomac River Basin. Washington, D. C.: Government Printing Office, 1930

2. The Climatology and Physical Features of Maryland. First Biennial Report, 1892 and 1893, Baltimore: 1894

3. Climate and Man. Yearbook. U. S. Department of Agriculture, Washington, D. C.: 1941

4. G. N. Brancato, "The Climate of Washington County", in The Physical Features of Washington County, Maryland, Department of G ology, Mines and Water Resources, Baltimore: 1951

The climate and weather conditions in the County are chiefly determined by the air masses that normally enter this area. Cold air masses come directly through and from northwestern United States and Canada and bring low temperatures in winter and cool spells in summer, or come from a more westerly direction bringing cool, dry weather. Comparatively warm and moist air masses originate over the oceanic waters to the south and east and bring to the County raining periods during part of the year, and hot and humid periods in summer.

In the Western Highlands Region, the westerly winds reach the area after crossing the Allegheny Mountains. The altitude of these mountains, over 2000 feet, causes some decrease in humidity and increase in temperature of the air when this wind direction prevails. The effects are more sunshine (larger number of clear days), slightly higher temperatures, and lower precipitation. Farther east this effect is not noticeable in the records of the stations.

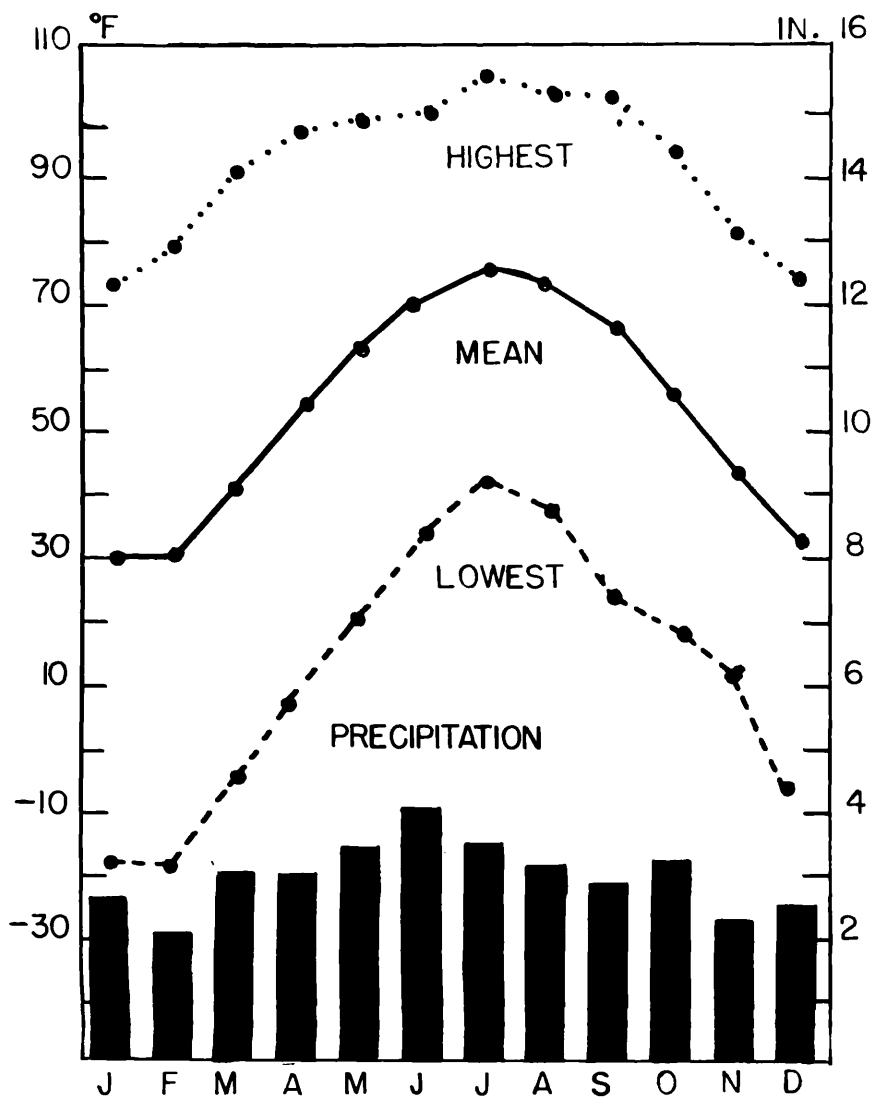
As has been stated previously, differences in elevation cause local modification of the climate. The Western and also the Eastern Highlands regions have comparatively high elevations, 800 to 2000 feet, while Hagerstown Valley Region lies mostly below 700 feet. This means a difference of 3 to 5 F in the mean annual temperature between the higher and lower parts of the County. Such small differences, however, do not affect materially the growth of the various crops.

TEMPERATURE

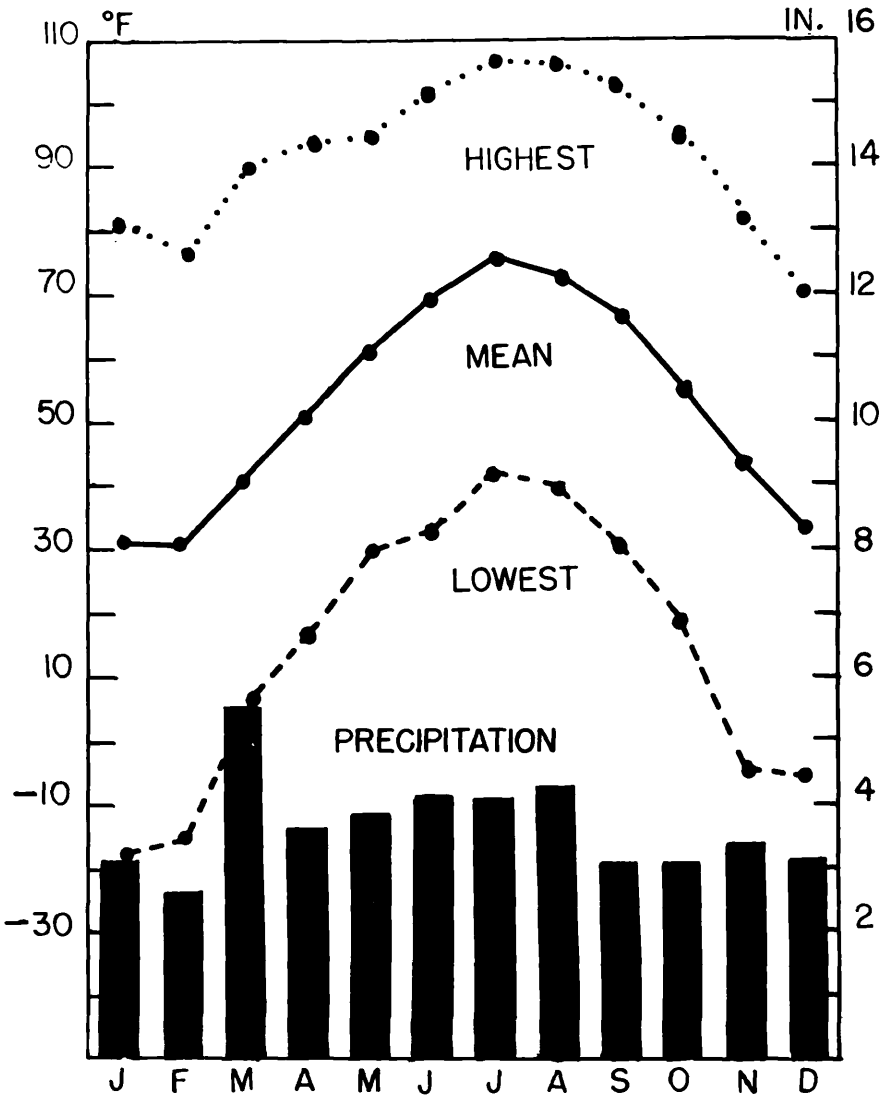
Differences in temperatures within the County are not great and are due to local rather than to general causes,

Plate 3

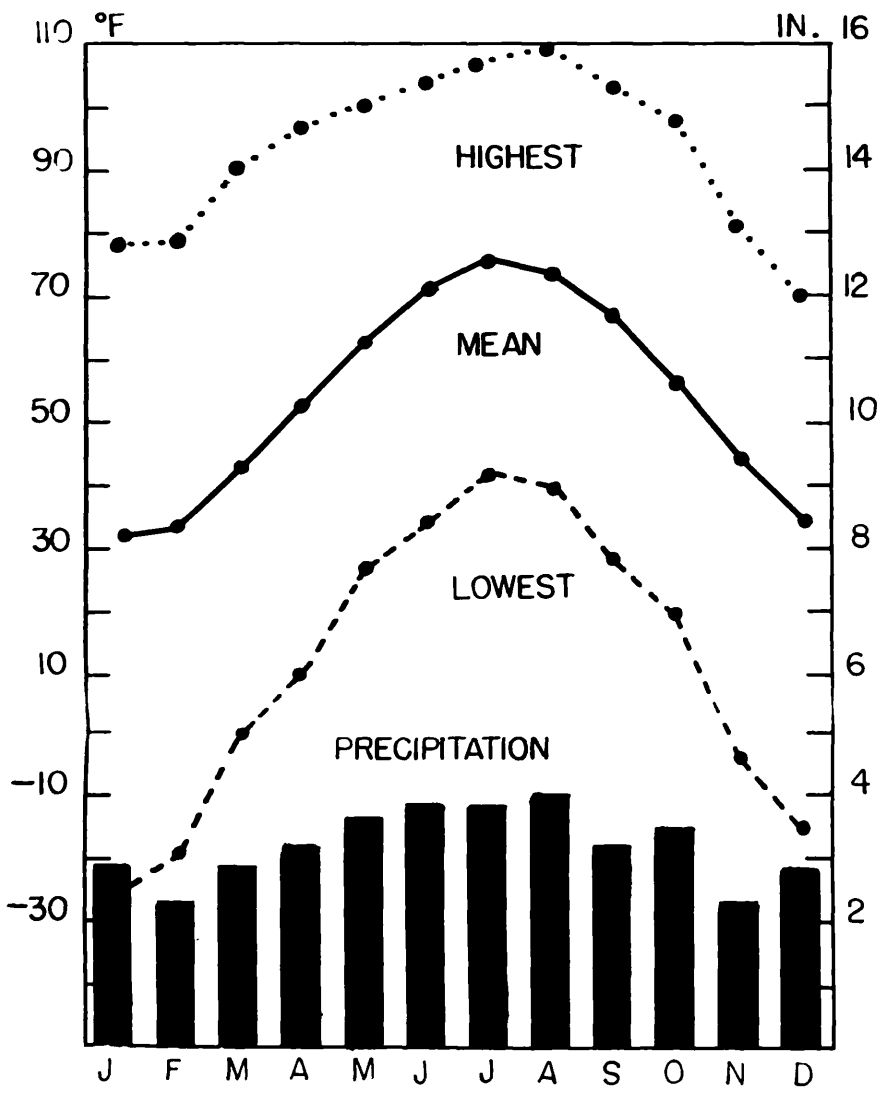
PLATE 3



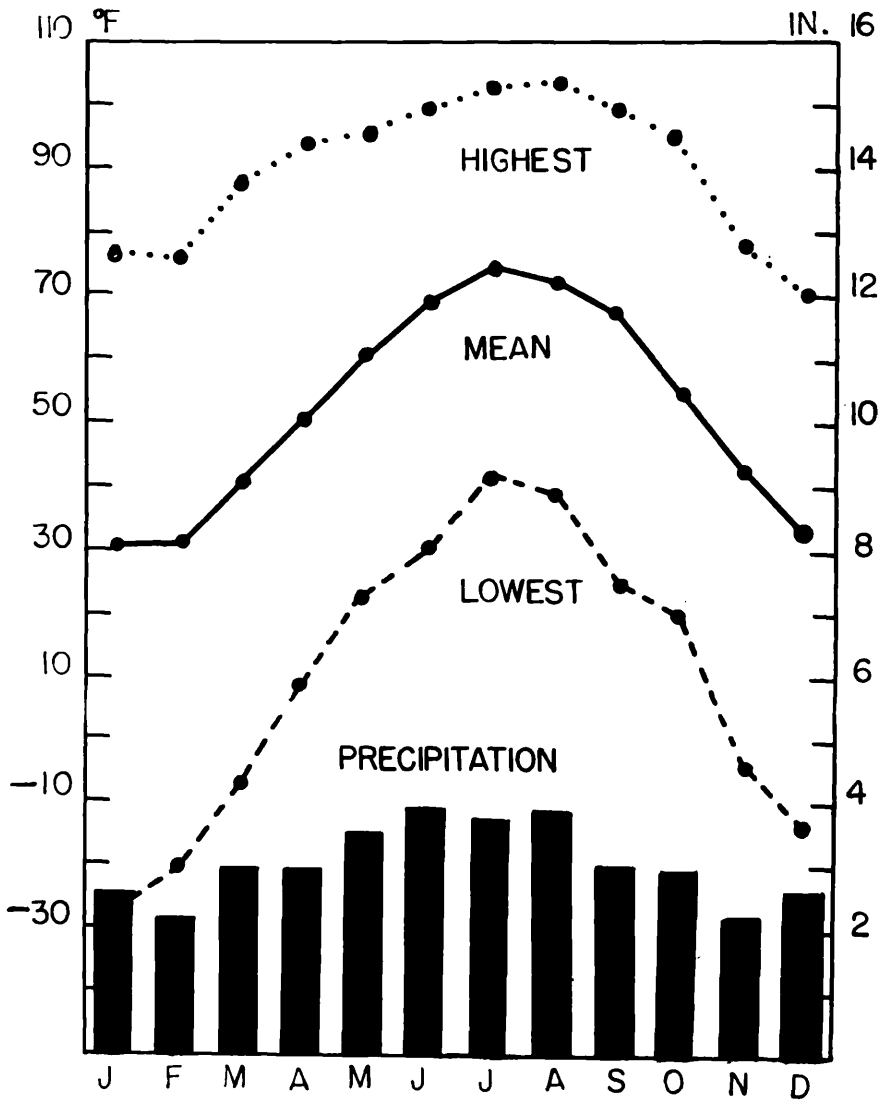
HANCOCK



CLEAR SPRING



KEEDYSVILLE



CHEWSVILLE

Table 1 - Elevation, Length of Record, Temperature, Precipitation, and Growing Season of Major Weather Stations of Washington County

					Temperatures in degrees Fahrenheit							Precipitation in inches					Killing Frost		
	Latitude	Longitude	Elev. above S.L. (feet)	Length of record (years)	Absolute max.	Absolute min.	Mean max.	Mean min.	Mean annual	Av. no. days of 90° or higher	Av. no. days of 32° or below	Greatest	Least	Average	Av. Snowfall	No. of clear days	Last in spring	First in fall	Av. length of frost-free season (days)
Chewsville	39° 38	77° 38	530	51	104	-27	62.2	41.3	52.2	21	124	11.57	0.08	36.90	28.6	138	May 3	Oct. 9	159
Clear Spring	39° 39	77° 56	500	45	107	-16	63.0	41.8	52.4	26	106	12.99	0.2	40.87	34.8	156	Apr. 24	Oct. 16	175
Green Spring Furnace	39° 36	78° 00	450	29	106	-14	64.0	41.9	53.0	32	120	9.25	0.31	37.06	28.4	205	Apr. 22	Oct. 14	175
Hancock	39° 43	78° 10	455	30	106	-18	65.4	40.2	52.9	43	133	9.68	0.13	36.09	26.9	-	May 5	Oct. 8	156
Keedysville	39° 29	77° 42	400	46	109	-26	65.7	42.5	54.1	38	116	11.66	0.16	38.10	26.2	178	May 1	Oct. 14	166
Tonoloway	39° 43	78° 14	700	26	107	-21	65.2	39.9	52.6	34	132	8.59	T	36.94	27.3	182	May 10	Oct. 8	154

particularly to differences in elevation. Unfortunately, no records are available for any of the higher altitudes within the area. The highest station is Tonoloway, which has an altitude of 700 feet; and a mean annual of 52.6°F. Chewsville, at an altitude of 500 feet, has a mean annual temperature of 52.2°F. The warmest station is Keedysville, at an altitude of 400 feet, with 54.1°F. Absolute maximum, mean maximum, and mean minimum temperatures are also higher at Keedysville than at other stations in Washington County. In general, three fairly straight isothermal lines may be drawn to show the distribution of mean annual temperatures of 52 , 53 , and 54°F. They cross the County in a southwest-northeast direction, and are almost equidistant. The 52-line passes a little north of Hancock and Chewsville; 53-line passes through Green Springs Furnace; and the 54-line passes through Keedysville. Thus, there is a gradual decrease in mean annual temperatures across the County from the southeast to northwest. Although the available data show only slight differences in mean annual temperatures, the actual differences should be somewhat greater, since in many of the stations, such as Hancock and Tonoloway, are located at a level considerably below the average elevation of Western Highlands Region. For instance, Hancock (455 feet) lies in a valley which is at least 300 feet below the adjacent ridge (Cove Ridge). The same is true in regard to the mean annual maximum and mean annual minimum temperatures (Table 1). Table 1 shows that Hancock has the largest average number of days with temperatures of 90°F or

over, and with 32°F. or below. The former is due to the fact that Hancock has more sunny days than Chewsville, being farther from the Atlantic Ocean and more under the influence of air passing over the Allegheny Mountains (Tonoloway 182 days and Chewsville 138; figures for Hancock are not available). The greater incidence of freezing temperatures at Hancock compared to other recording stations in the County is due to the prevailing wind, particularly in the cold part of the year.

Absolute maximum temperatures for Maryland are generally around 105°F., except in Garrett County and on the Eastern Shore. Table 1 shows that the highest temperature recorded in the County was 109°F. at Keedysville on August 6, 1918, which is the highest temperature ever reached in the State. At Keedysville the second lowest temperature in the County, 26°F. below zero, was recorded on the 14th of January, 1912. The lowest temperature recorded in the County was 27°F. below zero, and occurred at Chewsville on the day before (Table 1). It is significant to note here that, although the lowest mean minimum temperatures were observed in the Western Highlands Region, the absolute minimum temperatures occurred in Hagerstown Valley Region, probably because of local factors, principally air drainage. Most of the low temperatures occurred in the midwinter month of January.

Winter (December-February). The Tables in the Appendix show the monthly temperatures such as mean, mean maximum, etc. The major features of winter temperature distribution are

(i) the Western Highlands Region is slightly colder; (ii) Hagerstown Valley is warmer, especially the southern part; (iii) January is the coldest month, although the difference is only a degree or less.

The coldest weather of winter comes on clear days when strong currents of continental polar air sweep across the County from northwest or west. Mean monthly maximum temperatures in the County exceed 40 degrees, except at Hancock.

Spring (March - May). Spring weather conditions arrive in the Hagerstown Valley somewhat earlier than in the Highlands. In the western Highlands, winter conditions continue on the average into the third week of March. The most distinctive change which occurs in this season is an increase of not less than 10 degrees in the average temperature from February to March and again from March to April. This increase is observed not only in the mean monthly but also in the mean monthly maximum and mean monthly minimum temperatures.

Summer (June - August). Summer is a moderately long and pleasant season. Though mean temperatures in the County are often quite high, the elevated areas of the highlands remain much cooler. Thus, the summer mean 71, 72, and 73-degree isotherms which extend approximately from east to west across the County bend northward in the center, Hagerstown Valley.

Autumn (September - November). Autumn is a season of rapidly declining temperatures in which the characteristics

of winter soon overwhelm those of summer. Temperatures fall equally rapidly at all stations. From November to December, there is a decrease of 10 to 11 degrees in temperature at all stations.

HUMIDITY

The humidity of the air near the surface is little subject to local variations. The moisture contained in the air largely depends upon the type of air mass which enters the region. Local water bodies in Washington County have an entirely minor significance in affecting the humidity and can be virtually disregarded.

Data on humidity, relative or absolute, are not available for Washington County. In winter, absolute humidity is low, though relative humidity is at its peak (winter average 61 per cent). In spring and summer as absolute humidity rises, relative humidity falls, reaching a minimum during the warm season of the year.

Like other parts of Maryland, Washington County periodically is subject to an influx of very humid air from the south and southwest in spring, early summer, and early autumn.

PRECIPITATION

The County as a whole has fairly well-distributed precipitation. The precipitation of the County is fairly reliable; the odds are strongly against a large deviation from normal average monthly or average annual falls. As the total number of stations is small, little information is available on differences in total annual precipitation within the County.

Seasonal Variation. The fairly even distribution of precipitation throughout the seasons has already been stressed. Nowhere in the County is there a station having a month with less than a sixteenth of the annual precipitation. Nevertheless, a significant seasonal variation can be detected.

1. The winter (December - February) is a season of varying precipitation. At most of the stations, December has a slightly lower fall than January, and January has substantially higher precipitation than February. The precipitation of this season usually is showery, because of the lifting of warm air masses by cold air masses which usually are moving south or southeastward. It is important to note here that in the County precipitation increases from west to east in the cold months, especially during December and January.

Part of the moisture contained in air coming from the west is precipitated as rain or snow on the ridges of Allegheny Mountains. Allegany County, which is located west of Washington County, for example, receives less precipitation than Washington County. Similarly, Washington County has somewhat less winter precipitation than the regions farther east. The small deficiency in precipitation, from which some crops suffer in some years, may partly be due to the fact that the cold months have comparatively light precipitation.

2. In spring (March - May) the precipitation shows a substantial increase over the winter months. In general, precipitation is greater in May than in April, and in April than in March, with the exception of the Hancock and Chewsville areas, where the fall in April is slightly lower than in

March. A similar difference may be observed in the highest and lowest precipitation of this season.

3. Precipitation in the summer months (June - August) usually is highest, but also has the greatest variations from month to month and from year to year. Rain in this season is mostly in the form of showers, and is heavier during a given rainy period than in winter. The amount of precipitation--average about four inches per month--is quite adequate for the various crops. Higher precipitation in summer is very important, because temperatures are also high, and thus more water is needed to maintain soil moisture content.

4. In fall (September - November), the precipitation declines progressively. Its amount is greater than in winter but smaller than in spring. Autumn is the season of gentle rain, and the period between the season of high temperatures and heavy showers; and that of low temperatures, light rain and relatively heavy snow.

SNOWFALL

In the higher sections of the County snowfall starts as early as October and ends as late as April. It is heavier at Clear Spring than at any other station because of local topographic conditions. "The rising elevation from east to west in the vicinity of Clear Spring forces the snow-bearing air streams to rise, producing a lower temperature and increased snowfall."[1]

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[1] G. N. Brancato, op. cit., p. 264

FROST-FREE SEASON

This is the period between the last spring and the first autumn frosts. Average dates of the latest and earliest frost, and the mean duration of the frost-free period, are given for the stations in Table 1. The following generalizations can be made:

1. On the Western Highlands, where the stations are located next to high ridges such as Hancock and Tonoloway, the frost-free season (growing season) varies from 150 to 155 days.

2. In the eastern part of Hagerstown Valley, the growing season is rather short, because of some local geographical factors such as the location of the station in relation to elevations of adjacent areas and prevailing winds.

3. The longest growing periods in the County were recorded at the stations which are located on relatively level ground and are not immediately surrounded by high land, such as Green Spring Furnace.

The length of the frost-free season, the frequency of occurrence of the frost in spring, and the duration of the average cold spell in spring are of great importance to the orchardists. Also important is the frequency of comparatively warm periods in spring, followed by sudden drops in temperature.

The general climatic conditions in Washington County are favorable for growing the various grains and many kinds of fruits such as apples, peaches, and certain types of berries. Seasonal distribution of temperature, precipitation and length

of growing season are adequate. Neither of the two most significant climatic elements, precipitation effectiveness and temperature efficiency, has a limiting effect upon agriculture or other economic activities in the County.

In this Chapter, the climatic factors influencing the development of Washington County have been discussed. Another important phase, the human factor, will be partly presented in the following chapter.

CHAPTER V

NATURE AND DISTRIBUTION OF THE PEOPLE

A large percentage of the original settlers of Washington County were of Scotch-Irish, German, and English stock. Many of them came to the County directly from their countries of origin, where they had lived in physical and cultural environments, different from those of this part of Maryland. In general, those countries, at that time, were mainly agricultural. Thus, most of these settlers were farmers, interested in grain production. Many of the settlers came to Hagerstown Valley to seek the freedom and peace which had been denied them in their fatherlands. Some had suffered religious persecution and class prejudice.

> The denial of religious freedom to the Presbyterians of Ulster in 1719 started an exodus from Ireland of the bravest and best subjects of the British Crown. Many landed in Philadelphia and came to Washington County. A considerable number of Redemptioners or Indentured servants also became citizens of the Valley. /1/

The Scoth-Irish immigration into Washington County was the earliest and this was followed by a wave of settlers from Germany, who had left their native land for similar reasons and came to the County for the same purposes that motivated the Scotch-Irish groups.

> In 1732 Lord Baltimore published in England inducements to settlers, granting them 200 acre tracts. The people attracted were largely Germans who were being persecuted for religious principles. /2/

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[1] Arts and Letters Club of Hagerstown, "A Hearthstone History of Washington County", Hagerstown: 1935, p. 14

[2] Ibid., p. 15

The agricultural and industrial activities of the Scotch-Irish, German and English settlers in Washington County reflected, from the beginning, the influence of their cultural backgrounds. They raised mainly wheat but gradually adopted corn and raised rye and barley. They also produced honey, apple butter from crab apples and whiskey and made leather, linen goods and other household necessities. Settlers of other nationalities such as Swiss, and French were immigrated in small groups. Due to the fact that these nationality groups have been subjected during the past two centuries to intermingling and intermarriage, and also to the continuous movement of individuals and groups into and out of the County, the original traits of the various nationalities have been greatly subdued. This is discussed in more detail later in the chapter.

Negroes in Washington County are relatively small in number and have had little influence on its economic development. For instance, the total population of the County in 1790 was 14,472 of which 1,350 were negroes, 64 free and 1,286 slaves. Practically all of them were engaged in personal services and similar occupations. No change had occurred in this respect up to the last census, 1950, when only 4 male negroes in the County were engaged in farming or farm-management, and the rest (798), mostly unskilled, were employed in various manufacturing and service industries. Consequently, the colored group represents an insignificant element in Washington County and has been omitted from the following

discussion.

There are two questions which might be raised in considering the national origin of the people of Washington County: How great was the influence of the national origin upon the development of the County in the past? How much of such influence, if any, can be noticed at the present time? To the geographer or the social scientist, the national composition of the population of the County might appear to be an important factor in the determination of prevailing economic and social conditions. But a closer investigation would belie such an assumption. Mr. Scharf, in his geographical treatment of Washington County, says:[1] "Agriculturally, Washington County ranks as one of the most flourishing counties of Maryland, and its population is remarkable for intelligence, prosperity, and thrift." The author would agree with Mr. Scharf concerning his remark about the nature of the population of the County, if he considered that such characteristics were formed because of the prevalence of a certain type of physical environment under which the people of Washington County have lived for more than a century. But if he based his conclusions only on the national composition of the people, then the author would be in disagreement because prosperity, thrift, and, in part, intelligence, are characteristics which can be acquired by any group of people regardless of nationality by living long enough in a certain environment. Prosperity and

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[1] Thomas J. Scharf, op. cit., p. 973

thrift are products of the physical environment and not a matter of national characteristics. Favorable environmental factors create prosperity and uncertainty leads to thrift. Although the author's disagreement lacks statistical proof, Mr. Scharf's remark was not supported by any instance or, at least, by any comparison of the national or racial composition of the people of Washington County with those of other counties. None of the United States census reports carried population classification according to nationalities, except for foreign-born citizens who, in this area, are usually too small in number to be taken as representative. At any rate, Washington County does not occupy a unique position among the other counties of Maryland in regard to national or racial composition. The author feels that the prosperity in Washington County is merely a matter of suitable physical and economic factors, and not a matter of national composition of its people.

It is true that a certain national group could develop a specific industry in a region, such as, for example, the Swiss who developed the cheese industry in Wisconsin. But after examining the general composition of the population of Washington County, past, as well as present, no group of people similar to the Wisconsin Swiss stands out. It has been stated in Chapter II that the groups of early settlers in the County, between 1735 and about 1800, maintained to some extent their inherited culture, which was the product of their old environment in the motherland. In the course of time, each group tried to assimilate or imitate what the other groups were able to contribute to the general mode of living. Since then,

the differences between the groups have changed from major to minor significance, from distinctive to less distinctive, and from many to few. As time passes, the motives for maintaining culturally inherited characteristics become weaker and thus the extent of cultural variation diminishes. Each of the several immigrant groups was subject to major and minor changes, until the various groups presented one essentially homogeneous society.

At present, the mode of life of the people of Washington County does not reflect their European origins, but merely corresponds to the physical and economical advantages and disadvantages of the County. The present economic activities of the people in the three natural regions of the County are influenced by the physical variations of these regions, although their social activities are very much alike. In fact, Washington County in that respect is a miniature of a larger region, the Appalachian Belt. Furthermore, each of the three regions is occupied by people of the aforementioned stocks without predominance of one over the others. Some persons whom I interviewed could not even tell from what stock or stocks they descended. There is one exception to the preceding analysis of the County's population. These are the Mennonites who live north of Hagerstown and are engaged in farming and trade. The social, more so than the economic side of their life must be categorized separately from that of the rest of the people of Washington County. Although the Mennonites are a religious rather than a national group, they can be considered as a group of a certain nationality with a

cultural background which was brought from the homeland, even though the time element has changed many aspects of their daily life.

The present population of Washington County, in general, is made up of descendants of past generations who lived in the County and first developed its resources, and of comparative newcomers from Pennsylvania, West Virginia and from other counties of Maryland. These people are, as a whole, industrious, progressive, and thrifty. Of course, it must be said that their environment has taught them to be that way. Their sense of the value of land made of them remarkably successful farmers and fruit growers who try to maintain high productivity per unit of land by analyzing the type and quality of its soils and selecting the proper use for each soil. In their social life, they are serious, friendly, and enjoy many types of outdoor activities such as picknicking, hunting, horse-racing, parades, contests, and fairs. The average citizen of Washington County, regardless of age and sex, is remarkably interested in participating in the activities of cultural, social, and business organizations.

In order to discuss the present stage of development of Washington County, which is the major concern of this Dissertation, the growth of the population and its movement within the County from farm to town should be considered. There is always a definite relationship between increase of the population and economic development in any specific area such as Washington County. In fact, an increase in

population should come as a consequence of economic progress and prosperity. At the same time, the increase in number of people in any region creates a boom in real estate and building operations, an expansion in the production and consumption of food and goods, in wholesaling, retailing, etc., Another relationship must be found between the migrations within the region and changes in the nature of its economy.

It has been mentioned in Chapter II that the early settlers along Lower Conococheague Creek, where Williamsport was founded around 1735, were few in number. "20 adventurers and 300 laborers."[1] No statistics are available about the number of people who lived in the County between 1735 and 1790, but some of the historians, such as Mr. Williams and Mr. Scharf, stated that the number of settlers was increasing continuously and in some periods rapidly right after the first settlement, with the exception of the period of the French and Indian War. During the vast movement of pioneers and settlers toward the West, many new settlements were established in Hagerstown Valley, particularly after the Revolutionary War.

> At the beginning of the 18th century and after the Revolutionary War, new communities settled in the Valley. The county seat had grown into an attractive town. Many new industries had sprung up . . . . /2/

Several small towns were established during the 18th century; Sharpsburg in 1763 and Boonsboro in 1796.

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[1]Arts and Letters Club of Hagerstown, loc. cit.

[2]Helen Ash Hays, op. cit., p. 17

Plate 4

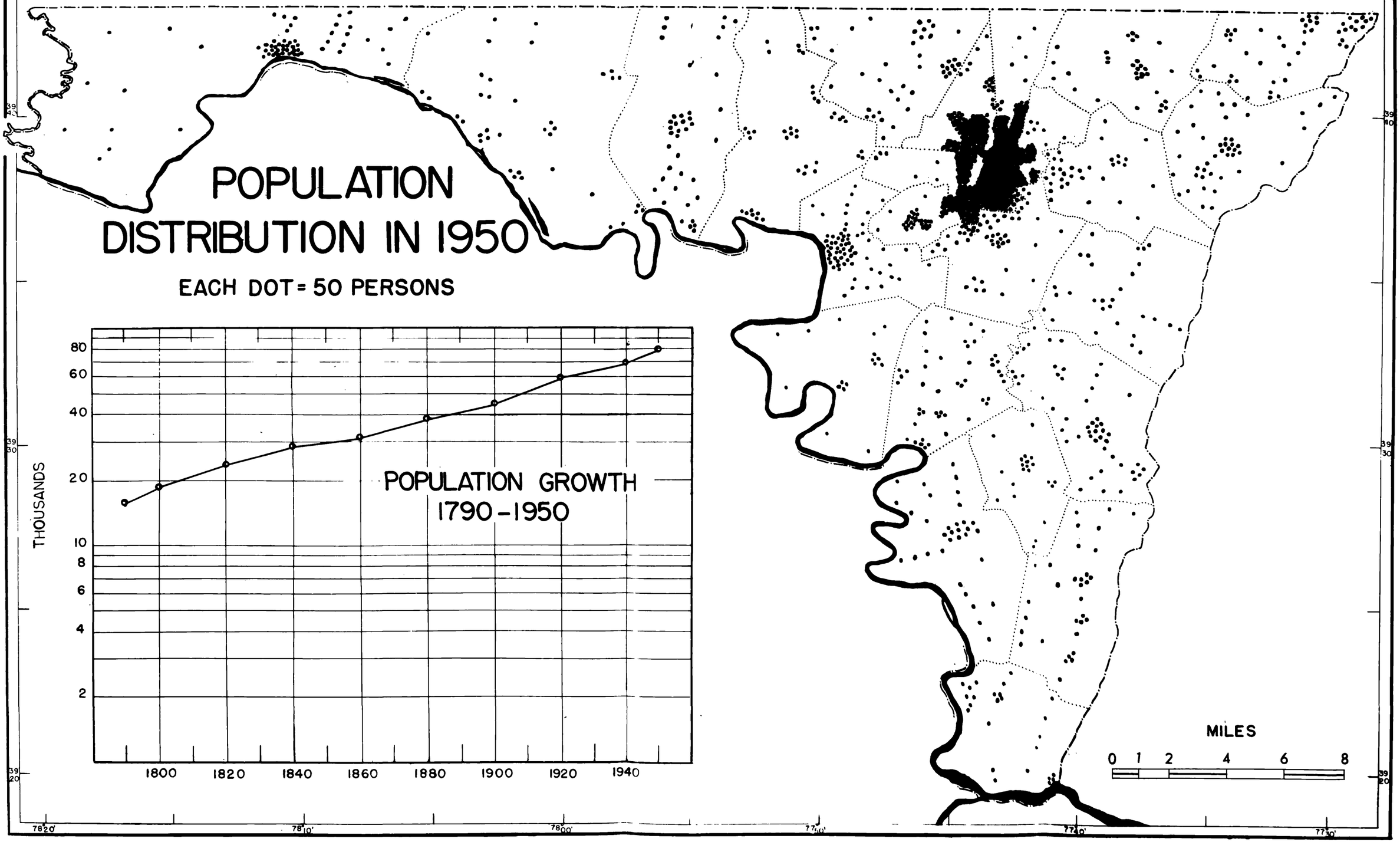
Population Distribution
in 1950

WASHINGTON COUNTY, MARYLAND

PLATE 4

POPULATION DISTRIBUTION IN 1950

EACH DOT = 50 PERSONS



The Graph on Plate 4 shows the population growth of Washington County between 1790 and 1950. This Graph shows clearly the steady, continuous increase in population, and, since its vertical scale is logarithmic, rates of change from decade to decade are comparable. The steadiness and the continuity of the increase can be related to three factors: first, an absence of any unusually great influx of settlers into the County in any specific period; second, a rate of natural increase which has remained fairly stable; and third, an absence of a significant outflow of people from the County.

In addition to the per cent of change from decade to decade and the total population of Washington County in the past sixteen decades, Table 2 shows the number of the whites and non-whites. The non-white group has been small in number throughout the entire period. However, the number of the non-whites decreased after 1840, probably because of the relative ease with which negroes in this area could move north. Two reversals in this trend occurred: one during the decade 1870-1880, which probably resulted from the Civil War, and the other during 1940-1950, which resulted from the establishment of a war industry, the Fairchild Aircraft Division, and from expansion of other manufacturing and service industries in Hagerstown. The majority of the non-whites--mostly negroes--live in Hagerstown. Other negroes who work in the Hagerstown industries prefer to live in nearby Pennsylvania towns.

Map 4 shows the population distribution in 1950. It is obvious that almost one-half of the people (36,260) live in Hagerstown, the center of trade, transportation, industry, and administration of Washington County. The second largest town is Williamsport (1,890). The map also shows that population of the Central Region far exceeds that of the Eastern and Western Regions (Plates 4 and 6). This pattern of distribution has a direct relationship to relief features, types of land use, and industrial development. The Eastern Region ranks second to the Central Region in population, while the Western Region is only thinly populated. For a further analysis, see Chapters VI and VII.

TABLE 2. Population Growth of the County Between 1790-1950; White, Non-White, Total, and the Percentage of Change

Year	White	Non-White	Total	Per cent of change
1790	14,472	1,370	15,842	
1800	16,108	2,542	18,650	17.9
1810	15,591	3,139	18,730	0.04
1820	19,247	3,828	23,075	23.2
1830	21,277	3,991	25,268	9.5
1840	24,724	4,126	28,850	14.2
1850	26,930	3,918	30,848	6.9
1860	28,305	3,112	31,417	1.8
1870	31,874	2,828	34,712	10.5
1880	35,495	3,066	38,561	11.1
1890	37,274	2,508	39,782	3.2
1900	42,642	2,491	45,133	13.5
1910	47,497	2,120	49,617	9.9
1920	57,446	2,248	59,694	20.3
1930	63,865	2,017	65,882	10.4
1940	67,048	1,790	68,838	4.5
1950	76,691	2,195	78,886	14.6

Source: U. S. Census Bureau

Table 3 shows the population distribution by districts in 1900 and 1950. Sharpsburg, Keedysville, and Downsville Districts show a decrease in population during this 50-year period. There was a constant migration from these districts to other parts of the County, mainly to Hagerstown. This movement, which carried out of the districts not only the natural increase but also some of the population listed in the 1900 census, came about because the districts in question are exclusively agricultural; they also do not have highly productive soils, and, therefore, could not offer a satisfactory level of income to some of the inhabitants. Other districts, such as Clear Spring, Indian Spring, Boonsboro, and Rohrersville, had only a slight increase in population during the same period, for similar reasons. An increase of 500 or more is shown for Conococheague, Ringgold, Wilson, and Tilghmanton Districts. The largest increases were in districts 3, 17, 21, 22, 23, 24, and 25, in and near the city of Hagerstown (see Table 3 for the number of districts). The population about tripled, during the first half of the present century, from 13,591 in 1900 to 36,260 in 1950. Halfway District No. 26 was formed about 1926 and has been subject to a substantial increase in population during the past two decades, because part of the expansion of Hagerstown has entered this district. Actually not only Halfway District, but also Funkstown, Chewsville, Beaver Creek, and Conococheague Districts include people who commute daily to Hagerstown for work.

The fact that the total population of Washington County increased steadily at a fair rate, combined with the fact that the majority of the districts showed only slight increases or even decreases, indicates that there was a continuous movement from the rural areas to Hagerstown. Table 4 presents the urban and rural population from 1900 until 1950, by 10-year intervals. The table shows that during this period the County had an increase of 11,084 in rural population and 22,751 in urban population. In 1950, the total urban population was 36,260 and the total rural population was 42,626. However, part of the rural population is classified as rural non-farm, i.e., out of a rural population of 42,626, a total of 33,656 are so classified. This makes a total of 69,916 people in the County who are classified by the Census as non-farm people, or almost nine-tenths of the population of the County. According to the Census, the strictly farm population of the County was only 8,970 in 1950.

Hagerstown, with its new industrial and commercial developments, has been able to absorb the newcomers from within the County and from outside the County during the past five decades without causing economic or social problems to its people. During this period, Hagerstown showed the most remarkable growth in its entire history. Its real development began about 1870, when its population was 5,779. Since then, the growth has been steady in nature, substantial in measure, and encouraging in stability and diversity. In 1880, its population was 6,627 and by 1890 it had reached 10,118,

TABLE 3. Population of Washington County by Minor Civil Division (Districts), 1900 and 1910

County and Districts	1900	1950
Washington County	45,133	78,886
Dist. 1, Sharpsburg	1,963	1,652
(Sharpsburg town)	(1,030)	(866)
Dist. 2, Williamsport	2,666	3,290
(Williamsport town)	(1,472)	(1,890)
Dist. 3, Hagerstown	533	6,629
Hagerstown City (part)	--	(6,339)
Dist. 4, Clear Spring	1,820	1,985
(Clear Spring town)	(474)	(558)
Dist. 5, Hancock	2,202	2,889
(Hancock town)	(824)	(963)
Dist. 6, Boonsboro	1,988	2,531
(Boonsboro town)	(700)	(1,071)
Dist. 7, Cavetown	1,751	2,206
(Smithsburg town)	(462)	(641)
Dist. 8, Rohrersville	1,414	1,432
Dist. 9, Leitersburg	1,271	1,379
Dist. 10, Funkstown	1,245	2,317
(Funkstown town)	(550)	(879)
Hagerstown City (part)	--	(42)
Dist. 11, Sandy Hook	1,586	1,218
Dist. 12, Tilghmanton	1,354	2,185

TABLE 3. Population of Washington County by Minor Civil Division (Districts), 1900 and 1910 (Continued)

County and Districts	1900	1950
Dist. 13, Conococheague	1,402	2,062
Dist. 14, Ringgold	1,190	2,261
Dist. 15, Indian Spring	1,585	1,662
Dist. 16, Beaver Creek	1,090	1,370
Dist. 17, Hagerstown	386	5,544
Hagerstown City (part)	--	(5,163)
Dist. 18, Chewsville	889	1,533
Dist. 19, Keedysville	1,103	1,011
(Keedysville town)	624	417
Dist. 20, Downsville	960	882
Dist. 21, Hagerstown	497	7,075
Hagerstown City (part)	--	(5,756)
Dist. 22, Hagerstown	537	7,323
Hagerstown City (part)	--	(6,098)
Dist. 23, Wilson	964	1,845
Dist. 24, Hagerstown	536	4,404
Hagerstown City (part)	--	(4,145)
Dist. 25, Hagerstown	617	9,879
Hagerstown City (part)	--	(8,717)
Dist. 26, Halfway	--	2,322
Halfway (unincorporated) part	--	(1,979)

Source: U. S. Census Bureau

an increase in one decade of over fifty per cent. In 1900, the total population of the City was 13,591, which increased to 16,507 in 1910 and jumped to 28,064 in 1920. Thus, there was an increase of 11,557, seventy per cent, in one decade, 1910 to 1920, and the population more than doubled in 20 years. Since 1920, the increase has continued, ranging in per cent of change from 5.3 to 11.6, until the total population reached 36,200 in 1950 and probably over 38,000 in 1952 (Table 5). The increase in the population of Hagerstown, during the period 1900 to 1950 coincided with that of the urban population of the County (Tables 4 and 5), as no other town in Washington County that can be classified as an urban center, according to the U. S. Census Bureau criteria, has expanded to such an extent.

As far as Washington County is concerned, the racial composition of the population bears no visible relationship to its general economic development. The present racial composition of the population of the County cannot be considered as a factor in such development, since the number of the non-white group has always been very small in relation to the total population; and the original stocks present in the County had mixed biologically and culturally fairly early in its history.

Rate of growth and change in the distribution and predominant economic activities of the population are intimately connected with industrial developments within the County. These relationships are further dealt with in Chapters VI and VII.

TABLE 4. Urban and Rural Population of Washington County Between 1900 and 1950

Year	Urban	Rural	Total
1900	13,591	31,542	45,133
1910	16,507	33,110	49,617
1920	28,064	31,630	59,674
1930	30,861	35,021	65,882
1940	32,491	36,347	68,838
1950	36,260	42,626	78,886

Source: U. S. Census Bureau

TABLE 5. Population of Hagerstown Between 1850 and 1950

	Population	Increase over preceding census and percentage	
		Number	Per cent
Hagerstown City			
1850	3,879	254	7.0
1860	4,132	253	6.5
1870	5,779	1,647	39.9
1880	6,627	848	14.7
1890	10,118	3,491	52.7
1900	13,591	3,473	34.3
1910	16,507	2,916	21.5
1920	28,064	11,557	70.0
1930	30,861	2,797	10.0
1940	32,491	1,630	5.3
1950	36,260	3,769	11.6

Source: U. S. Census Bureau

CHAPTER VI

ECONOMIC ACTIVITIES OF THE PEOPLE

The pattern of population distribution of Washington County does not reflect accurately the major economic activities of the people. As was indicated in the preceding chapter, the greater part of rural non-farm population works in Hagerstown, and in certain other centers. The non-agricultural activities, i.e., construction, manufacturing, and service industries in the County are, however, mostly concentrated in Hagerstown. The significance of Hagerstown in the economy of the County has been increasing constantly, as Hagerstown had become the industrial center of the County. The role of Hagerstown in this regard will be discussed in Chapter XII.

The increase in the urban and rural non-farm population and decrease in the rural-farm population were limited by unfavorable economic conditions between 1930 and 1940. Since 1940, however, the respective increases and decrease were considerable, as shown below, reflecting the industrial and commercial trends during World War II.

	1950	1940	1930
Urban	36,260	32,491	30,381
Rural non-farm	33,656	23,842	21,584
Rural-farm	8,970	12,505	13,437

It is obvious that since 1930 the rural-farm population has been decreasing continuously, contrary to the urban population and the rural non-farm population.

Three major classes of economic activities will be considered:

1 - Agricultural Employment

2 - Manufacturing Employment

3 - Service Employment

AGRICULTURAL EMPLOYMENT

Since 1930 there was an absolute decrease in number of the rural-farm population (see the figures above). A similar decrease was shown in the total number of farmers, farm managers, and farm laborers; 4,244 in 1930, 3,092 in 1940, 2,506 in 1950.* The distribution of the rural-farm population in Washington County in 1940 is given in Table 6 (statistics for 1950 are not available). This Table shows that the rural-farm population relative to the total population is higher in the districts which have no town of substantial size and are not too close to Hagerstown, such as, 9, 13, 15, 16, and 23. The lowest numbers are in Districts 3, 17, 22, 24, and 25, in which the people are mostly engaged in non-agricultural activities in Hagerstown. The other districts are in between these two categories.

The rural-farm population in Washington County is engaged in three major types of farming; fruit-farming in the Western Region, general and dairy farming in the Central Region, and fruit and mixed farming in the Eastern Region (see Plate 6 for the extent of the regions, and Chapter VII for further analysis).

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*Note. Statistics were calculated from the respective U.S. decennial reports on population, and are presented in Tables 6, 7, 8, and 9.

TABLE 6. Total and Rural-Farm Population of Washington County, by District in 1940*.

District	Total	Rural-Farm	Districts	Total	Rural-Farm
Wash.Co.	68,838	12,505	Di. 15	1,566	778
Di. 1	1,813	558	" 16	1,085	576
" 2	3,127	458	" 17	4,932	-
" 3	6,125	23	" 18	1,230	675
" 4	1,735	397	" 19	945	350
" 5	2,988	437	" 20	856	458
" 6	2,339	875	" 21	5,702	274
" 7	2,044	760	" 22	6,102	203
" 8	1,366	606	" 23	1,074	588
" 9	1,288	792	" 24	4,687	160
" 10	1,889	262	" 25	7,739	293
" 11	1,428	364	" 26	1,769	208
" 12	1,618	466			
" 13	1,729	897			
" 14	1,662	547			

* Source: U.S. Census Bureau

As a result of favorable physical factors, the Central Region is intensively cultivated and its farming is progressive and mechanized. The farmers in the Region, in order to attain high productivity per unit of labor and also, when possible, per acre, have concentrated on dairy, beef-cattle, and poultry. They grow corn, small grains, and pasture crops primarily for feed. Number of them have come to this part of the County in comparatively recent years from Pennsylvania to seek cheaper land, or from West Virginia to seek better land. The farming chores are done by unpaid family or kindred workers both male and female. The need for hired labor in the Central Region is limited in any season of the year, as more farm and dairy machinery has been used, especially during the past decade. In the Eastern Region, the farmers grow fruit, as well as corn and small grains used mainly to feed beef and dairy cattle. Because of the great differences in elevation in this Region, some part of practically every farm is planted in fruit trees, and the rest in grain and pasture. Labor is furnished mostly by unpaid family workers, except during the fruit-harvesting season when a limited number of farm laborers is needed. Such laborers are usually available locally. In the Western Region where rugged terrain is predominant, most of the farmers concentrate on orchard crops, particularly in the Hancock District. Others who farm the lower lands, usually grow limited quantities of grains and vegetables, and raise a limited number of livestock, mostly sheep. Inasmuch as the orchards in this Region are of the commercial type, and as several orchards are frequently owned by grower, many of the farmers in this Region are actually wage

earners. During the fruit-harvesting period additional laborers are needed, but usually can be obtained locally. Table 6 shows that the rural-farm population in Hancock District is remarkably small, relative to its size and total population. Almost one-third of the total population, 940 people, live in the town of Hancock, and are rural non-farm population. They are mainly engaged in commerce, transportation, road construction, and service industries.

From the preceding discussion it is clear that farming of any type in Washington County depends mainly upon the rural-farm population to furnish labor. However, there was a substantital decline in agricultural employment during the 1940-1950 decade, particularly when contrasted with total non-agricultural employment in the County. The rural population has become increasingly a non-farm population (see Table 7). This change has resulted in a reduction in the acreage of farm land, and an increase in the use of labor-saving devices. (Further discussion will be presented in the following chapter). Almost two-thirds of the employed rural-farm labor are classified as farmers, farm managers, farm foremen, and farm laborers. Most of the rest are craftsmen, operatives, and kindred workers (Table 7). Table 7 also shows that the unemployed rural-farm labor force is remarkably small, and has decreased since 1940. However, as shown in Table 7, a small portion of the rural non-farm population was engaged in agricultural activities. In 1940 there were 635, and in 1950 there were 645 "rural non-farm" people employed in agriculture as farmers, farm managers, and farm laborers. The rest of this group was engaged in non-agricultural activities in Hagerstown or

TABLE 7. Characteristics of Rural-Farm, Rural Non-Farm and Urban Population of Washington County in 1940 and 1950*

	Rural-Farm		Rural Non-Farm		Urban
	1950	1940	1950	1940	1940
Washington Co.	8,970	12,505	33,656	23,842	36,260
Male and Female employed	3,058	4,013	11,081	6,478	12,090
Profession, technical and kindred workers	75	96	721	346	
Farmers and farm managers	1,194	1,507	158	89	40
Managers, officials and proprietors	71	68	929	578	1,190
Clerical, foremen and kindred workers except farm	105	138	1,059	849	2,424
Sales workers	68	6	725	50	
Craftsmen, foremen and kindred workers	277	275	2,384	1,058	1,878
Operatives and kindred workers	338	308	2,858	1,520	3,415
Private household workers	35	135	167	250	
Service workers, except private household	54	53	633	269	973
Farm laborers, unpaid family workers	99	385	17	14	5
Farm laborers, except unpaid and farm foremen	590	845	470	532	79
Laborers, except farm and mine	130	136	831	800	545
Occupation not reported	22	61	130	113	

TABLE 7. Characteristics of Rural-Farm, Rural Non-Farm and Urban Population of Washington County in 1940 and 1950. (continued)

	Rural-farm.		Rural non-farm		Urban
	1950	1940	1950	1940	1940
Male 14 years old and over	3,354	4,800	12,460	8,962	12,247
Civilian labor force	2,779	3,926	8,890	6,694	9,812
Employed	2,739	3,805	8,539	6,192	8,558
Unemployed	40	121	351	502	628
Not in labor force	569	874	3,550	2,268	2,435
Female 14 years old and over	2,942	4,303	12,038	8,618	13,386
Civilian labor force	330	516	2,619	1,429	4,048
Employed	319	480	2,542	1,311	3,532
Unemployed	11	36	77	118	289
Not in labor force	2,612	3,787	9,417	7,189	9,338

*Source: U. S. Census Bureau

other towns, such as Smithsburg, Williamsport, and Hancock.

Table 8 shows that one-seventh of the total employment was in agriculture in 1940, and this proportion had decreased to one-fourteenth by 1950. At the same time, employment in the other industry groups increased substantially, i.e., in manufacturing, construction and services. Employment in forestry, fishing, mining, and quarrying, is small and decreased between 1940 and 1950.

MANUFACTURING EMPLOYMENT

The continuous and rapid increase in the population of Hagerstown was directly related to industrial development. Many of the manufacturing (see Chapter XII) and related industry groups were concentrated in Hagerstown and its vicinity, and attracted a substantial portion of the rural non-farm labor force. The growth of Hagerstown from 1900 to 1950 is a result of the development of manufacturing. The great increase in population of Hagerstown between 1910 and 1920, 11,557, was accompanied by a decrease of 1,480 in rural population, but an increase of 9,943 in total population of the County. This indicates a remarkable shift in employment from agriculture to manufacturing and service industries during this period. During the following decade, the condition was reversed, as urban population showed only a slight increase, 2,797, while the increase in rural population was 3,391 out of a total increase of 6,208 for the County as a whole. This was smaller than the increase of 1920, because of the decline in the

TABLE 8. Major Economic Activities of the Population of Washington County in 1940 and 1950*

	Total		Hagerstown
	1950	1940	1940
Total population	78,886	68,838	32,491
Persons 14 years old and over	59,075	52,316	25,633
Labor force	31,220	26,425	13,860
Employed	29,925	22,581	12,090
Private wage and salary workers	23,894	18,206	10,675
Government workers	2,050	505	1,276
Self employed workers	3,720	3,688	1,276
Unpaid family workers	261	491	68
Unemployed	1,252	1,694	917
Not in labor force	27,855	25,891	11,773
Industry groups			
Employed	29,925	22,581	12,090
Agriculture	2,685	3,537	139
Forestry and fishing	7	8	1
Mining and quarrying	107	110	-
Construction	1,751	1,046	509
Manufacturing	10,004	5,875	3,723

TABLE 8. Major Economic Activities of the Population of Washington County in 1940 and 1950. (Continued)

	Total		Hagerstown
	1950	1940	1940
Railroads and express service	2,021	1,543	979
Trucks and others	727	461	1,277
Trade	5,474	3,307	2,272
Various services	6,749	6,694	4,190

Source: U. S. Census Bureau

scope of manufacturing and service activities during the short period preceding the great depression of the early 1930's. In 1940, the County had a slight increase in population, which because of the expansion in production of manufactured goods immediately before World War II, was more pronounced in the urban population than in the rural population, 1,630 and 1,326, respectively. The 1950 Census[1] shows a substantial increase in the urban and rural non-farm population, a condition which reflects the influence of the demand for manufactured goods during and after World War II.

Table 8 shows that, in 1950 there were increases in total population, labor force, and total employment in Washington County over the 1940 figures. The ratio of increase of employment was far higher than that of the labor force and the total population. The Table also shows a decrease in unemployment in the County from 1940 to 1950. Employment in manufacturing in 1940 was mainly in Hagerstown and was about sixty percent higher than that in agriculture, but by 1950 it had become about four times as large as agricultural employment. Although for 1950 a breakdown of the economic activities of the population of Hagerstown is not available, the major proportion of those engaged in manufacturing worked in Hagerstown.

Much of the increase in factory employment between 1940 and 1950 was in industries producing machinery and transportation equipment, almost exclusively aircraft. Textile and

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[1] The U.S. Census Bureau decennial reports on the economic characteristics of the population, are the source of the statistics of this presentation.

leather and leather products industries showed a decrease in employment from 1940 to 1950. Other industries, such as fabricated metal, food and kindred products, and chemical products, showed only a slight increase in employment (see Table 9).

According to the statistics collected by the Bureau of Business and Economic Research, University of Maryland, the average manufacturing employment in 1945 was higher than in 1950, and its ratio to the total employment in the County was also higher.[1] The decline in this class of employment was a result of a reduction in production of various manufactured goods during the post-war period.

The percentage of employment in manufacturing to total employment in Washington County in 1944 was 70.7. Since then, the percentage has been subject to a continuous decline, with slight fluctuations between 1948 and 1950, until it reached 53.5 in 1950.* This decline in manufacturing employment has been partly compensated by increase in employment in trade. "..... the relative position of trade in 1950 is shown in the following comparison: average monthly employment in trade in 1944, 2700; in 1950, 4998; percent increase, 85."[2]

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[1]Unpublished material; in 1945, total employment was 18,350 and manufacturing employment was 12,125, and in 1950 they were 20,166 and 11,251, respectively.

*Bureau of Business and Economic Research, University of Maryland, "Flow of Business in a Diversified City, Hagerstown, Maryland", Studies in Business and Economics, Vol. V,No.1, June 1951, p.2.

[2]Ibid.

As a result of the industrial development in the County and the expansion of Hagerstown, a great need arose for new buildings, to house the business and industrial establishments as well as the many people who moved from the various parts of the County to Hagerstown and neighboring districts. Table 8 shows that almost one-half of the construction employees in 1940 were drawn from the population of Hagerstown. Most of the rest very likely were furnished by the rural non-farm population (see Table 7). This employment which increased substantially between 1940 and 1950 (Table 8) was mainly in building construction, rather than road construction. For several reasons, such as lack of materials and high cost, construction employment remained at a low level until 1946, but doubled in 1947. In other words, the great demand for new housing units, storage facilities, etc., which developed during World War II, would not be satisfied until after 1946, when materials for construction became available. Chart 1, (p.2) Flow of Business in a Diversified City, Hagerstown, Maryland, presents the percentage of construction employment of total employment in the County between 1944 and 1950. The significance of the Chart to this study is to show the correlation between construction employment and manufacturing and service activities. Construction employment has declined since about 1948, but in 1950 was still almost 70 per cent higher than in 1940.

TABLE 9. Employment of the Major Manufacturing Industries in Washington County in 1940 and 1950*

Industries	1950	1940
Furniture and lumber and wood products	762	417
Metal and fabricated metal	199	180
Machinery	1,175	661
Motor vehicles	13	36
Transportation equipment except motor	3,329	584
Other durable goods	973	469
Food and kindred products	516	463
Textile mill products	878	1,077
Apparel and other fabricated textiles	461	161
Printing and publishing	352	231
Chemical products	198	92
Leather and leather products	1,095	1,504

*Source: U.S. Census Bureau

SERVICE EMPLOYMENT

Service employment is made up of that part of employment which is engaged in railroad, express, trucking and other transportation services, in trade, and various other services. Table 8 shows transportation service employment in Washington County for 1940 and 1950 and for Hagerstown in 1940 (1950 figures for Hagerstown are not available). It reflects the significance of the location of the City and its industrial and commercial establishments in relation to the County and the adjacent areas. The Table also indicates that railroad and trucking employment have substantially increased from 1940 to 1950. Employment in transportation accounted for 8 percent of the total in 1950.

Plate 9 shows that four major railroads: Western Maryland Railroad, Shenandoah Valley Division of the Norfolk and Western Railroad, Cumberland Valley Division of the Pennsylvania Railroad, and the Hagerstown Branch of the B & O Railroad, connect Washington County with other regions from which raw materials, fuel and goods are carried to the County and to which the agricultural and manufactured products are shipped from this County. All the railroad tracks converge in Hagerstown, where storage and shipping facilities have been constructed. Practically all raw materials needed for Hagerstown's manufacturing industries are brought in and some of the agricultural commodities, particularly wheat, are shipped out of the County by railroads. In 1940, a large portion of the shipments

originated in Hagerstown, and consequently almost two thirds of the County's railroad employees were located in this City. Statistics for 1950 are not available, but it is very likely that they would indicate that a similar, or higher proportion of the County's railroad employment is located in Hagerstown. Small railroad stations of limited initial shipments are located in Hancock and Williamsport.

A similar picture is presented in Table 8 in regard to employment in trucking and other transportation services. It is significant to note that railroad employment substantially exceeds other transportation employment. This fact indicates the importance of the role of railroads in the economy of the County. Employment in transportation services other than railroads is engaged in trucking which is widely used for carrying farm products from the farms to Hagerstown, Baltimore, Washington, D.C., Philadelphia, etc. In addition to the privately-owned trucks, there are 13 truck companies such as, Allied Van Lines, All States Freight Inc., Hagerstown Motor Express, and Horn Motor Express. Passengers services are supplied by the railroads and by several bus lines which serve within the County, or transportation to and from the County such as, Blue Ridge, Potomac River Lines, L.M. Motor Lines, and Potomac Edison Company. Most of the movements are initiated or terminated in Hagerstown, where the depots of the various lines are located.

Table 8 also presents the number of persons employed in

trade in 1940 for the County as a whole and for Hagerstown. These figures include persons employed in wholesaling, retailing, food production, including dairy products, and in eating and drinking places. The U.S. Census Bureau report on the economic characteristics of the people of Washington County shows that 472 were engaged in wholesaling; of these 313 were in Hagerstown; and 1,313 in retail trade, of which 1,142 were in Hagerstown; almost two-thirds of the rest devoted their economic activities to wholesaling and retailing food in Hagerstown. This is another instance showing that Hagerstown is the center of the non-agricultural activities of the people of Washington County. In contrast with manufacturing employment, employment in trade was larger in 1950 than in 1945. Thus, Hagerstown maintained its position as a major business center during the War period and in the post war years. The growth of trade employment was created in part by the expansion of manufacturing, construction, and transportation activities in Hagerstown and in part by the increasing flow of business into this city from various parts of the County and adjacent areas, as well. The trade employment of Washington County, which is mainly in Hagerstown, serves besides the people of this County, also those of Allegany and Garrett counties, Maryland, and Fulton and Franklin counties, Pennsylvania. Actually, the middlemen - dealers and wholesalers - in Hagerstown handle a considerable portion of the trade of adjacent counties. The location of Hagerstown, its transportation facilities and industrial development will assure

at least a maintenance of its present level of employment in trade.

Employment in manufacturing relies mainly upon specific industries, i.e., the aircraft industry which has been established in Hagerstown. In view of the fact that this location offers no particular physical or economic factors of advantage to the maintenance of such an industry, there is the possibility of a reduction in the manufacturing activities in Hagerstown with attendant decline in the service activities of the people of Washington County and of Hagerstown in particular.

Employment in other services, such as, educational, repair, tourist and personal services, has been initiated and enlarged by the expansion of Hagerstown and its recent industrial development. The scope of such employment is directly correlated with the other economic activities. The location and expansion of this employment in 1940 and in 1950 are the same as those of trade and manufacturing employment.

The preceding discussion of the economic activities of the people of Washington County has shown that the non-agricultural class has expanded, while the agricultural class declined during the past fifty years and particularly between 1930 and 1950. Although no sound basis for comparison between the gross or net income of agricultural and non-agricultural activities of the people is available, the number of persons employed and the median income per family in both classes of activities indicate

the magnitude of non-agricultural employment in relation to agricultural employment.[1] In the following chapters the economic activities of the people of Washington County will be discussed from the standpoint of size and importance of the various industries.

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[1] According to U.S. Census Report of 1950, the income level of the people of Washington County was as follows:

1. Median income by family	$2,448
2. " " " " for urban population	2,792
3. " " " " " rural non-farm	2,412
And by computation the median income by family for the rural-farm population	2,140

CHAPTER VII

THE AGRICULTURAL PATTERN

In this Chapter, the adjustment of agricultural activities to the physical conditions of the environment will be discussed, as well as the geographic distribution of the various types of agriculture. The discussion will refer primarily to present land use (see Plate 5), but a brief historical analysis will be given to elucidate the present agricultural pattern as it has developed during the past century.

The present pattern of land use in Washington County reflects certain physical characteristics of the County, but it has also been affected by economic conditions and individual initiative. The land use will be discussed according to three major divisions: the Eastern, Central, and Western Divisions. While these Divisions resemble closely the Regions established from a morphological point of view in Chapter III, they differ in some details. So as to prevent confusion the term "division" will be used instead of "region". An anlysis of these Divisions will be presented jointly to show the main characteristics of the agricultural pattern of the County, but each division will also be discussed separately, so as to take into consideration minor agricultural differences within each division. The criterion used for dividing Washington County into three agricultural divisions is the combined acreages of land in forest, woodland and orchard. However, similar results would be

Plate 5

Land Use in 1950

WASHINGTON COUNTY, MARYLAND

PLATE 5

LAND USE IN 1950

78°20' 78°10' 78°00' 77°50' 77°40' 77°30'

39°30' 39°20'

A B C D

- DAIRY AND BEEF CATTLE FARMING
- GENERAL FARMING
- FRUIT FARMING, MAINLY APPLES
- FRUIT FARMING, MAINLY PEACHES
- FRUIT FARMING, APPLES AND PEACHES
- CULLED HARDWOODS AND PINE
- MERCHANTABLE HARDWOODS

MILES

0 1 2 4 6 8

obtained by using acreage of grains or density of livestock as criteria for classification. The use of the former criterion seems more logical. The correlation between the distribution of woodland and forest and the ridges and mountains can be easily observed by superimposing Plate 5 over Plate 1.

The density of forest and woodland, and also of orchards is much higher in the Eastern and Western Divisions than in the Central Division (see Table 10). In Table 10 the districts are listed roughly according to the divisions into which they belong. Even this approximate listing shows distinctly the higher acreage of woods and orchards in the Eastern and Western Divisions. However, parts of the districts listed under the Eastern Division actually belong to the Central Division, and share with this Division, the characteristics of low woodland and orchard acreage. This increases the relative importance of woodland and orchards in the Eastern Division. The total area of the Central Division is approximately larger than that of the two others, further accentuating the difference in the role of woodland and orchards.

A century ago Washington County was a grain-producing region, particularly of corn and wheat (Table 11). The grains were grown mainly on the fertile soils of the Central Division, while the Eastern and Western Divisions were partly in grain and native pasture, partly in forests and wooded pasture. Fruits were insignificant compared with other agricultural commodities.

TABLE 10. Total Area and Acreage of Fruitland and Woodland in the Three Divisions by District in 1945*

Division and District	Total area sq. miles	Acreage of Fruitland and Woodland		
		Fruitland	Woodland	Total
Washington County	458.4	11,200.4	34,953	46,153.4
Eastern Division				
District 14	14.4	951.9	475	1,426.9
" 7	20.4	1,374.8	813	2,187.8
" 18	18.2	194.0	469	663.0
" 16	23.1	164.0	492	656.0
" 6	21.3	307.1	782	1,089.1
" 19	12.6	102.0	367	469.0
" 8	21.3	81.8	1,895	1,976.0
" 11	18.2	218.1	1,626	1,844.1
Total	149.5	3,393.7	6,919	10,312.7
Central Division				
District 9	18.4	280.0	203	483.0
" 21	6.9	34.0	66	100.0
" 25	5.9	391.5	48	439.5
" 13	21.0	72.0	458	530.0
" 23	26.8	8.0	1,040	1,048.0
" 24	4.1	9.0	40	49.0
" 22	4.8	48.7	37	85.7
" 26	4.9	39.0	82	121.0
" 10	15.7	23.1	239	262.1
" 2	14.2	104.4	649	753.4

TABLE 10. Total Area and Acreage of Fruitland and Woodland in the Three Divisions by District in 1945 (continued)

Division and District	Total area sq.miles	Acreage of Fruitland and Woodland		
		Fruitland	Woodland	Total
District 20	22.0	27.0	1,043	1,070.0
" 12	17.8	29.0	317	346.0
" 1	25.3	27.6	1,946	1,973.6
Total	187.8	1,165.3	6,168	7,271.3
Western Division				
District 4	28.0	344.0	2,242	2,686.0
" 15	28.5	491.0	9,015	9,506.0
" 5	53.4	5,138.0	10,812	15,950.0
Total	109.9	5,973.0	22,069	28,142.0

*Figures for 1950 are not available

Source: U. S. Census Bureau (unpublished)

The value of the orchard products in 1850, for instance, amounted to only $8,217, while the total value of all agricultural products was $8,419,596.

Table 11 shows that, in 1850 wheat ranked far above the total production of all other grains combined. It was the major agricultural crop, both insofar as production and cash value were concerned. The surplus wheat was shipped to Baltimore for sale in the State and elsewhere. Corn ranked second to wheat. It was produced mainly for use on the farm, though some was sold for cash. From 1850 onwards corn production increased, until it had more than tripled by 1900. This increase had a direct relationship with the increase in livestock in the County (compare livestock in 1850 and 1900 in Table 12). The other grains, rye, oats and buckwheat were relatively minor crops and barley was insignificant. These grains were used mostly for feed. During the period 1850 to 1900, production of rye and oats decreased greatly, while buckwheat increased almost fivefold and barley showed a slight increase in production. In 1900 wheat production was slightly higher than in 1850 (Table 11). Tonnage of hay production in 1850 was relatively small, but had more than doubled by 1900. The small production of hay in 1850 and the sale of grain for cash reflected the insignificance of dairy farming. Production of Irish potatoes increased more than fourfold from 1850 to 1900. Fruit growing in general in Washington County, was in the early stages of development during the second half of the nineteenth century, although fruit trees of various kinds and origin were planted in the foothill areas.

TABLE 11. Production of Major Agricultural Commodities in Washington County in 1850, 1900 and 1950.

Commodities		1850	1900	1950
Wheat -	bushels	809,093	829,700	587,232
Rye -	"	32,940	9,440	3,572
Corn -	"	368,066	1,201,250	1,127,481
Oats -	"	102,869	26,040	69,497
Irish Potatoes	"	22,460	93,634	57,981
Barley	"	82	100	304,823
Buckwheat	"	239	1,130	303
Hay -	ton	14,860	36,387	50,764
Clover seed	bushel	1,988	-	-
Other grass seeds	"	679	-	-

Source: U.S. Census Bureau.

Berries and cherries were produced on small patches. Apples, peaches and pears became increasingly important after 1860 in the Eastern Division, and about thirty years later in the Western Division. The fruit crops will be further discussed in the following chapter.

The total acreage of land in farms in 1850 was 220,729, which increased to 249,221 acres in 1950. The unimproved land was reduced from 60,878 acres in 1850 to 51,273 acres in 1900.

The number of livestock in Washington County increased between 1850 and 1900. Cattle, milch cows, beef-cattle, and sheep showed higher ratios of increase than pigs. All were subject to fluctuations from one decade to another during the period. The number of poultry more than doubled between 1880 and 1890, but it decreased again in the following decade; figures for the preceding three decades are not available (Table 12). The number of draft animals also increased between 1850 and 1900.

For the period following 1900, the discussion will be based upon acreage rather than production of the various grains, because in the author's opinion, in this type of area acreage in general, provides a more reliable basis for the study of the agricultural pattern. Magnitude of production varies from year to year, not only according to changes in acreage, but to a greater extent as a result of certain climatic and biological factors. For the discussion of the period 1850 - 1900, production had to be used, because acreage figures were not avail-

TABLE 12. Livestock in Washington County Between 1850 and 1950*

Year	Cattle total	Milch cows	Beef cattle	Pigs	Sheep	Poultry	Horses
1850	13,071	5,835	7,236	24,345	9,736	---	6,166
1860	18,271	6,841	11,434	29,425	10,460	---	8,027
1870	16,333	6,310	10,023	20,212	9,268	---	8,423
1880	17,569	7,470	10,099	28,185	12,512	81,429	8,619
1890	18,033	8,306	9,712	26,124	9,045	165,681	9,842
1900	18,601	8,032	10,569	26,843	14,075	149,350	9,814
1910	17,281	9,288	7,993	26,989	17,088	176,388	11,106
1920	19,537	13,924	5,613	30,104	7,516	222,235	10,728
1925	17,131	10,284	6,847	21,513	6,384	222,634	8,519
1930	21,862	14,155	7,707	13,627	16,768	192,983	7,508
1935	20,063	10,883	9,180	18,783	9,014	180,261	6,840
1940	19,298	10,956	8,342	15,986	5,505	197,138	7,087
1945	25,539	13,302	12,237	22,203	4,094	191,187	5,902
1950	30,675	14,767	15,908	19,936	4,677	159,479	2,735

*Source: U. S. Census Bureau

able for 1850, 1860, and 1870. Development of orchards between 1900 and 1950 is disclosed in Chapter VIII which deals exclusively with the fruit industry.

Between 1900 and 1950 the acreage of corn, rye, and hay crops decreased slightly. Total tonnage of hay in 1950, however, was far above that in 1900 (Table 11), because in later decades hay in Washington County was obtained not only from hay-grasses, but also from the various small grains, rye, barley, oats, and even wheat. The greatest reduction in wheat acreage (almost twenty percent) occurred between 1920 and 1925, and it continued to decrease thereafter, though at a slower rate. The acreage of oats more than doubled and barley rose from eight to over 9,000 acres during this period, particularly from 1930 on (Table 13). A comparison of the figures of acreage and production of grains in 1900 with those of 1950, shows that yield per acre was higher in 1950 than in 1900. Barley shows a far greater increase in yield per acre than any other grain.[1] This increase was attained by using more and better fertilizers and by more efficient methods of farming.

The reduction in wheat acreage and the increase in production of barley, oats and hay during the past fifty years indicate a shift from grain to livestock and livestock products as cash crops. Wheat is the only grain produced in Washington County for food, and is the only important cash grain. For instance, three-fourths of the wheat crop were sold in 1950, but only one-fourth of the corn crop. Surplus wheat is

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[1] Yield per acre of corn, wheat and barley in 1900 was 32, 14 and 12 bushels; and in 1950 was 38, 21 and 33 bushels, respectively.

TABLE 13. Acreage of Grains and Hay in Washington County from 1900 to 1950

Year	Corn	Oats	Wheat	Rye	Barley	All Hay
1900	37,526	1,132	59,955	816	8	30,700
1910	39,161	1,064	57,299	1,354	-	28,673
1920	38,567	1,591	64,498	989	260	26,808
1925	32,905	2,228	49,060	1,405	1,297	28,214
1930	34,293	925	49,543	1,609	741	26,663
1935	32,459	915	42,921	1,900	3,489	26,783
1940	32,871	925	41,855	763	5,997	27,694
1945	32,924	1,198	36,715	833	6,452	27,269
1950	29,597	2,517	28,002	189	9,044	25,352

Source: U.S. Census Bureau.

usually handled by Hagerstown dealers and shipped from their grain elevators by rail to Baltimore. Other grains are handled by millers and used for feed mainly within the County.

Much of the grain and hay acreage is located in the Central Division. The Eastern Division ranks second (see Table 14).

The total number of livestock in Washington County in 1950 was slightly below that of 1900.[1] However, the total number of cattle, as well as the number of milch cows increased by almost sixty percent during this period. Pigs and sheep decreased considerably in number; and poultry increased slightly (Table 12). The number of horses in 1950 was only about one-fourth of that in 1900, the result of increased use of tractors and motortrucks.[2]

The substantial increase in the number of cattle during the first half of this century indicates the rise of dairy and beef-cattle farming in Washington County. The increase in the number of cattle required some adjustments in the acreages of grains and grasses as previously discussed, since a larger number of cattle created a higher demand for feed in the County. The acreage of hay decreased slightly in the fifty-year period, while the decrease in corn acreage was more pronounced. However, increases in yields almost balanced these decreases in acreage. In order to maintain a balance between the increased demand and production, larger acreages were sown to barley and

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[1] 236,000 heads in 1950 and 237,000 heads in 1900.

[2] There were 400 tractors in 1940, 900 in 1945 and 1,600 in 1950. Motortrucks 1,000 in 1945 and 1,100 in 1950.

Table 14 - Grains, Hay and Livestock in Washington County by District in 1945*

Division and District	Grains and Hay (acres)						Livestock					
	Corn	Oats	Wheat	Rye	Barley	All Hay	Cattle Total	Milch Cows	Pigs	Sheep	Poultry	Horses
Eastern Division												
District 14	813	27	846	105	156	801	614	429	802		13,778	165
District 7	997	67	825	63	271	714	645	405	802		14,327	205
District 18	1,699	112	1,802	38	437	1,684	1,034	641	1,236	Not	9,973	346
District 16	1,536	65	1,617	48	142	1,262	849	612	1,455		9,235	299
District 6	1,817	76	1,983	139	367	1,588	1,102	903	892	Avail-	10,601	355
District 19	1,236	22	1,400	13	290	1,294	713	588	141		5,037	267
District 8	1,171	85	1,146	90	205	1,112	630	590	784	able	10,252	296
District 11	426	32	254	84	22	1,406	332	196	240		3,286	106
Central Division												
District 9	2,141	98	2,101	19	414	1,675	1,474	947	1,571		15,945	350
District 21	929	14	967	-	119	759	479	472	881		5,411	104
District 25	732	31	904	4	113	572	573	357	332		10,567	109
District 13	2,309	36	2,778	36	242	1,801	1,422	1,119	1,566	Not	12,744	313
District 23	2,459	63	2,674	63	430	2,409	1,287	761	1,982		7,490	383
District 24	585	15	712	-	191	526	298	218	425	Avail-	3,639	115
District 22	540	4	489	-	130	439	412	261	250		2,413	92
District 26	442	18	377	-	84	444	191	134	290	able	2,233	70
District 10	1,991	44	1,851	2	367	1,478	956	721	744		6,054	305
District 2	1,512	25	1,567	13	360	1,164	828	529	704		5,923	270
District 20	1,622	15	2,467	5	380	1,633	1,061	586	850		6,296	329
District 12	1,661	-	2,065	-	422	1,564	1,081	689	1,561		8,962	335
District 1	1,770	-	2,671	-	365	1,536	1,159	715	973		6,261	345
Western Division												
District 4	2,316	54	2,658	20	550	2,073	1,016	654	1,593	Not	13,327	388
District 15	1,293	99	1,547	48	142	1,420	705	383	687	Avail-	6,692	208
District 5	822	89	716	42	40	1,060	387	225	589	able	9,166	196

* - Figures for 1950 are not available.

Source: U. S. Census Bureau (unpublished).

and oats, and more hay was produced from alfalfa, clover, and small grains. Thirdly, the numbers of other livestock such as pigs, sheep, and particularly horses were substantially reduced (Table 12). Many of the farmers still purchase some of their feed supply in the form of mixed grains, which is usually brought in from other feed-producing areas. In addition, all dairy and beef-farmers rely exclusively upon other areas for high protein feeds to improve the quality and the quantity of their products.

Table 14 shows the distribution of livestock by districts, a pattern that conforms with that of grain and hay production. This correlation is logical in an area where livestock is fed in barns and raised within the fences of farms. No natural pastures of any size can be found in Washington County, because any areas of native grasses have become improved pastures after having been fertilized yearly and seeded once every five years or so during the period in which there has been a great demand for better pasture. Most of the cattle, sheep, and pigs are raised in the Central Division. The Eastern Division ranks second (see Table 14).

In Washington County, the total acreage of land in farms in 1950 was 218,540 acres, equivalent to 73.9 per cent of the total county area. The farm land was divided into 2025 farms, an average of 107.9 acres per farm. Few farms are under 49 acres or over 1,000 acres in area. Many farms are from 200 to 400 acres in size. Practically, all the farms are operated and owned by whites. Almost two-thirds of these farms

are owner-operated, one-fifth are operated by tenants, the rest are farmed by part-owners, managers, and share-croppers.[1] Much of the County is in cropland and improved pasture, leaving the steep slopes and the summits of the mountains and the poorly drained lands along the banks of the streams in forest and woodland.[2]

From the standpoint of cash value, dairy farming was more important in 1950 than beef-cattle, grain, or fruit farming. Besides, the dollar value of the dairy products sold in 1949 was fifty per cent higher than in 1944.[3] The indications are that the present trend in dairy production will continue. A similar trend can be seen with regard to the value of poultry and poultry products.[4] The cash value of grains as well as of fruits decreased from 1944 to 1949, because of decreased production and a declining market price.[5] The figures given for value of grains sold,[6] however, are misleading as to significance of the various crops in the agricultural economy of

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[1] In 1950, there were 1,422 full owners, 144 part owners, 23 managers, 42 tenants and 10 croppers (U. S. Census Bureau)

[2] In 1950, there were 142,384 acres in cropland, 62,599 acres in land pastured, 8,017 acres in woodland pastured and 82,911 acres in forests and woods.

[3] Dairy products sold in 1949 - $3,000,000
in 1944 - 2,000,000

[4] Poultry and/or poultry products sold in 1949 - $820,000
in 1944 - $560,000

[5] Value of all fruits sold in 1949 - $1,300,000
in 1944 - $1,923,000

[6] Value of all crops sold in 1949 - $2,800,000
in 1944 - $3,400,000

the County, because much of the corn, barley, oats, and rye which was handled by dealers or millers was resold to other farmers within the County for feed. Real value of such grains came out of the farms again in terms of the value of meat and milk, which surpassed the total value of fruits in 1949.[1]

In order to show the variation within the three agricultural divisions, two cross-sections are discussed as samples of the generally observable characteristics of the agricultural pattern of Washington County.

1 - A-B cross-section (Plate 5) starts from "A" on the Potomac River, passing through Sharpsburg and west of Hagerstown and ends at "B" on the State line. This cross-section presents only the type of agriculture found in the Central Division. At the southern end the wide valley of the Potomac River appears with an island in the middle, which is covered with woods. North of the woods which occupy a narrow strip of alluvial plain along the bank of the River, gently undulating farm land appears within a monotonous landscape which extends toward the east and the west, but this monotony is interrupted by the valley of Antietam Creek to the east. Small fields of wheat, corn, barley, alfalfa, and clover occupy most of the land. Farm houses and small barns stand in the middle of the many fenced farms, and cattle, pigs, and sheep graze the pastures. Passing the little town of Sharpsburg

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[1] Value of animals sold alive in 1949 - $1,937,000

and moving northward, there is no noticeable change in the physical or cultural landscape. Two miles north of Sharpsburg are a few small orchards. After crossing Sharpsburg Road northward, the landscape is characterized by the large houses, big barns and high silos of beef and dairy farms. Cattle and pigs roam over green pastures enclosed by white and well-constructed fences. Fields of barley, corn, wheat, alfalfa, and clover are predominant. Moving northward to Tilghmanton District, the better dairy farms and the most progressive farming in the County appear. Hagerstown is located to the east, and many dwellings can be seen scattered along Route U.S. 11 or clustered in a small town which is actually part of the western expansion of Hagerstown. Numerous roads and railroads which extend from Hagerstown northwestward and southwestward are a major feature in the landscape of this part of the Valley. Here may be noticed a decrease in the number and size of dairy and beef-cattle farms and an increase in the number of houses along and near the roads, because Districts 26, 24,and 25 are under the direct influence of Hagerstown. At the northern end of the cross-section orchards appear on both sides, particularly north and northeast of Maugansville. Nevertheless, this section is still included in the Central Division, which is dominated by dairy, beef-cattle, and general types of farming (see Plate 5).

2 - The C-D cross-section extends from Frederick County on the east to Allegany County on the west, and intersects the first cross-section north of Maugansville (Plate 5). This

cross-section differs from A-B cross-section in that it runs in an east-west direction, thus traversing the three agricultural divisions.

Starting in the east we encounter first forests and woods on the upper slopes of South Mountain, then a fruit belt along the foothills. West of the Western Maryland Railroad track the furit belt grades into more diversified farm land, where in addition to orchards there are fields of grain and pasture. Fruit trees occur on land of comparatively high elevation, hills and ridges. Grains and pastures are scattered in the valleys and on the slopes of many minor ridges and hills. Such a mixture might occur even on one farm if the farm is sufficiently large, a condition obtaining in both Western Ringgold and eastern Leitersburg Districts. Moving westward, dairy farming becomes predominant. In Conococheague District where C-D would intersect A-B, many orchards are observed along and north of the cross-section line (use Plate 9 for location of districts). This area to the north of Hagerstown is crossed by several roads and railroads from that city toward Pennsylvania. Also large dairy and beef cattle farms give this area another characteristic. Continuing westward, a similar landscape is found throughout the Wilson and Clear Spring Districts until the continuity is terminated by Powell Mountain. From Powell Mountain to the end of the cross-section the physical and the cultural landscapes show great diversity. High ridges alternate with narrow and deep valleys occupied by many small or large streams. Forests and woods cover the steep slopes; pastures and fields of grains and vegetables are

scattered in the valleys. Small orchards are found in Indian Spring District. The large orchards which give the Western Division its significance in the fruit industry of Washington County are concentrated east and west of the town of Hancock, Hancock District.

Below the three agricultural divisions of Washington County will be discussed individually, in order to point out their individual agricultural characteristics, and indicate the correlation between the physical factors and the human activities.

EASTERN DIVISION

This Division includes most of Ringgold and Cavetown Districts in the north, the eastern portions of the districts of Chewsville, Beaver Creek, Boonsboro, and Keedysville, and the greater parts of Rohrersville and Sandy Hook Districts. In other words, it covers the Eastern Highlands, South Mountain, Pleasant Valley, and Elk Ridge. The total area of the Division is smaller than each of the other two divisions, 15 per cent of the total area of the County.

The physical conditions in this Division made the area best suited to fruit growing. Consequently, a substantial portion of it has been devoted to fruit, but more land is still available for this purpose. The most important fruit producing center is the Ringgold-Cavetown area, where peach trees are most numerous and apple trees are second in importance, although small fruits are also grown. Toward the south, through the Chewsville, Beaver Creek, Boonsboro, Rohrersville, and Sandy Hook

districts, a gradual change in type of farming can be observed. Orchards become less predominant, giving way to beef-cattle and poultry which acquire an important position, because of their cash value. Thus, in the Eastern Division there are two predominant types of farming, fruit farming in the Ringgold-Cavetown area and mixed farming in the rest of the Division. Mixed farming here includes production of fruits and grains, or fruits and livestock. With exception of the growers of fruit only in the Ringgold-Cavetown area, the farmers in this Division grow both fruit and grains, the latter for cash or for feed. Although the physical conditions in this Division are suitable for a successful fruit business, the general tendency of the farmers, particularly in the southern districts, is toward fewer fruit trees and more livestock, in order to insure better cash returns and to avoid the risks involved in fruit growing.

Except for a few large fruit growers in the Ringgold-Cavetown area, practically all farmers in this Division rely upon livestock as much as on fruits, if not more, i.e., farmers in Boonsboro, Keedysville, Rohrersville, and Sandy Hook Districts. Large orchards usually occupy the upper slopes and the steeper parts of slopes not well suited for other crops. Small orchards are scattered over the tops of the hills and along the foothills of South Mountain and Elk Ridge. The rest of the land in this Division is used for grain production and pastures.

Farms in the Eastern Division are generally larger in size, have a greater variety of crops and have poorer and more

Photo 5. A young peach orchard in the Ringgold-Cavetown area. Note the extension of the fruit belt on the lower slope of South Mountain.

shallow soils than those in the Central Division, but the physical factors in the Eastern Division are better suited for agriculture than those in the Western Division. In order to present the agricultural activities of the farmers in this Division, samples have been selected from the farmers interviewed (see also Table 15).

Mr. A lives on a farm located in the eastern foothills of Elk Ridge, three-fourths of a mile west of Sandy Hook. His family consists of three people, himself, his wife, and a son, who has assumed the entire responsibility of the farm. Mr. A's farm includes about 310 acres of rolling land, a little hill of gentle slope on one side and steep slope on the other, and a flat strip along the road. On this farm there are 100 acres in fruit trees, apples and pears, 135 acres in pasture; the rest is in woods. The apple trees are quite old, 20-30 years in age, and mostly are of inferior varieties. Consequently, his apple crops for most of the past years have been poor in quality and quantity. Nevertheless, he does not intend to plant better varieties, because his major plan for the future is centered around livestock and pears. His reason, as stated during the interview, was that the apple business in this part of the County, where costs of labor and land are high, is unprofitable and it would pay better if the farm was utilized for livestock and pear trees. Pear crops are marketed in Hagerstown or Brunswick, Frederick County, while the apple crops are usually sold to buyers from Virginia, at the beginning of every season. He preferred to dispose of his apple crops in

this way, in order to avoid the task and the risk of shipping and marketing.

On the pastures Mr. A raises 55 head of beef-cattle, and he is planning to increase the number. The pastures are mainly in alfalfa and clover. No grains are grown, and, consequently, he buys grains and protein for feed. His fields are fertilized by chemical fertilizers, 3-12-6, (200 pounds per acre), nitrate (3 pounds per tree) and animal manure which is carried out daily from the barn.

Mr. A needs laborers in spring and summer. They are usually hired from the neighboring farms. Fertilizing and spraying are done by mechanical devices, but are not as advanced as those used in the Ringgold-Cavetown area.

Mr. B has a small farm located two miles south of Keedysville. He came to this part of the County fifteen years ago in order to establish a fruit farm, and ever since he has operated the same farm. His farm is a small one, 39 acres, 5 in pasture and the rest in fruits and vegetables. Mr. B and his wife do most of the chores. A limited amount of help is needed in spring and summer. His major complaint is the difficulty in getting farm labor, because most of the available labor on farms is absorbed by the industrial and commercial establishments in Hagerstown.

Mr. B's farm is divided into plots, the largest of them - 18 acres - is used for apple trees. Others are used for peaches and raspberry. Tomatoes and other garden vegetables for home consumption are produced on a small plot. In addition,

Table 15 - Farm Samples in Washington County

Division and Farm	Total area (acre)	Land in crops (acre)	Land in pasture (acre)	Woodland (acre)	Owner-ship	Crops		Livestock		Rotation System		Fertilizer pound/acre	Source of Cash
						Kind	Acreage	Kind	Number	Crops	No. of years		
Eastern Division													
Farm A	310	100	135	75	full	apples) pears)	100	beef-cattle	55	-	-	nitrate 4-8-12	apples pears beef-cattle
Farm B	39	34	5	-	part	peaches) apples) rawsberry) vegetables)	34	chicken	335	-	-	10-6-4 3-12-6 4-8-12	fruits eggs
Farm C	175	165	-	-	full	apples peaches	100 65	-	-	-	-	nitrate 4-8-12	apples peaches
Farm D	375	245	80	50	full	apples wheat corn barley oats rye	70 50 30 60 25 10	beef-cattle milch cows	30 35	Corn, wheat, and hay	3 - 4	nitrate 3-12-6	apples milk beef wheat
Central Division													
Farm E	60	45	10	5	full	corn wheat barley oats	18 12 10 5	beef-cattle hogs sheep chicken	15 50 60 1000	corn, wheat and hay	3 - 4	3-12-6	livestock milk eggs
Farm F	160	140	20	-	tenant	corn wheat barley oats	30 60 35 15	milch cows hogs	20 75	corn, wheat and hay	3	3-12-6	livestock milk
Farm G	107	87	20	-	tenant	corn barley oats	45 37 5	milch cows beef-cattle chicken	30 23 50	corn barley oats	3 - 4	0-14-7 3-12-6	beef-cattle milk eggs
Farm H	85	65	20	-	full	corn barley rye	40 20 5	beef-cattle hogs sheep	15 12 30	corn, barley and hay	3	0-12-6	livestock
Farm I	68	35	30	3	full	corn wheat barley	15 15 5	milch cows hogs chicken	17 5 175	corn wheat and hay	3	3-12-6	milk livestock eggs

Table 15 - Farm Samples in Washington County (continued)

Division and Farm	Total area (acre)	Land in crops (acre)	Land in pasture (acre)	Woodland (acre)	Owner-ship	Crops		Livestock		Rotation System		Fertilizer pound/acre	Source of Cash
						Kind	Acreage	Kind	Number	Crops	No. of years		
Farm J	80	73	7	-	full	corn wheat barley oats	25 20 10 18	milch cows hogs chicken	15 50 700	corn wheat hay	3 - 4	3-12-6 5-10-10	milk hogs chicken
Farm K	125	100	25	-	tenant	corn wheat barley oats hay	40 30 25 5 25	milch cows chicken	35 100	corn, wheat and hay	3	3-12-6	milk eggs
Farm L	130	100	30	-	tenant	corn wheat barley oats hay	25 45 20 10 30	milch cows beef-cattle hogs sheep chicken	18 2 15 3 25	corn, wheat, and hay	3 - 4	3-12-6	milk eggs livestock wheat
Farm M	160	90	57	13	full	corn wheat barley oats hay native pasture	35 20 25 10 42 15	milch cows	30	corn, wheat and hay	3 - 4	3-12-6	milk wheat
Western Division													
Farm N	800	800	-	-	full	apples peaches	700 100	-	-	-	-	nitrate 4/tree 3-12-6 200/acre	apples peaches

he raises 335 chickens which lay an average of 720 eggs a week. Chicken feed must be purchased, because grains are not produced on the farm. This farm, which is like many others in the Division, shows two major crops raised on a single farm. Mr. B. planned this lay-out because of the high cost of labor and land and because he wanted to obtain the greatest cash income possible from his products. Location of the farm made the plan practical. Besides, not much farming machinery is needed on such a farm and unpaid family labor is sufficient to do the daily chores most of the year.

In order to get higher returns and at the same time, maintaining productivity of the soil, Mr. B used three types of fertilizers: 10-6-4, 4-8-12, and 3-12-6 with an average of 300 pounds per acre.

The last example is selected to present the other type of farming, fruit farming, found only in the Ringgold-Cavetown area. This farm is owned by and operated by Mr. C and located on the Hagerstown-Smithsburg Road, about one mile northeast of Smithsburg. It consists of two hills with an elongated depression between through which the track of Western Maryland Railroad has been built. The farm as a whole is situated in the foothills of South Mountain, right below the forest line. Mr. C has utilized his 175-acre farm for fruit growing only. Apple trees occupy 100 acres, peach trees 65 acres, and the rest is occupied partly by buildings and partly by raspberries.

Mr. C and his brother do most of the work on the farm throughout the year, except in the harvesting season when help

is needed for picking and crating. Spraying and fertilizing are done by specialized agricultural machinery, and according to programs prepared and issued by the State entomologist and horticulturist. The crops usually are shipped by trucks from the orchard to the market, such as Baltimore, Washington, D.C. or Pittsburgh. Mr. C, like many other fruit growers in the area, has no storage or packing facilities. His apples and peaches are stored and packed in commercial warehouses which are located in the markets and owned by the selling agencies. A further analysis will be presented in Chapter X.

CENTRAL DIVISION

The Central Division occupies more than half of the County. It covers the whole of Hagerstown Valley and almost coincides with the Central Region (Plate 6).

Because of favorable physical and economic factors this Division has been cultivated intensively, and its type of farming is different from those of the other two divisions. These factors are:

1. For the most part, the land is flat or gently undulating plain and of comparatively low elevation. This type of land form is suitable for the use of agricultural machinery.

2. The climate is well suited for the crops grown in this Division. The growing-season is sufficiently long, and adequate precipitation occurs throughout the year, though in some years dry spells occur in summer, and the limestone subsoils may aggravate the effects of dry weather.

Photo 6. A large dairy farm near Hagerstown. The field in the foreground has been prepared for seeding to a pasture crop. Barn, silo, a small shed for housing the farm equipment, and farm house are shown in the background. (Courtesy of Hagerstown Chamber of Commerce).

3. The soils of this Division are rich, fine-textured and deep and have deep subsoils. They are underlain by limestones from which their fertility is derived.

4. The location of this Division in relation to Hagerstown is a major factor in developing dairy-farming.

5. The high cost of farm land, $300-400 per acre, required an intensive type of farming and the use of more capital to increase production.

In brief, in the Central Division there is no great variation in climate, land form, or land use. Dairy and beef-cattle farming are predominant in the Division, except for the southeastern portion where general farming dominates (more than two major crops are raised on a single farm). The section located southeast of Hagerstown, which includes Funkstown District and parts of Beaver Creek and Boonsboro Districts, is the most productive part of the entire Division because of the richness and deepness of its soils. Farming here is highly mechanized; consequently, the need for help is usually limited.

In general, the size of farms in the Central Division ranges between 60 and 160 acres. Practically every farm, regardless of its size, is used for grain production and pasture. Woodland and orchards are insignificant. The principal grains are corn, wheat, barley, and rye. Pastures are seeded to alfalfa, clover and timothy. Usually corn fields occupy a third of the total acreage of a farm, a third is used for wheat, barley and oats, and the rest is left in pastures which produce hay. Practically all farmers in this Division follow a similar

rotation system, covering a period of from three to four years. Corn is planted the first year, barley, wheat, oats or rye the second, pasture the third or third and fourth years. Cropland and pastures are fertilized yearly with two types of fertilizers: (1) a chemical fertilizer, usually 3-12-6, average 300 pounds per acre, (2) manure, in quantities varying according to the number of animals raised on the farm.

Grains and hay are used as feed for livestock, although wheat is produced mainly for cash. However, farmers must buy additional quantities of grain and other types of feed every year in order to meet the needs of their livestock, and to provide enough protein foods. Although there is some variation in the number and kinds of livestock raised on the farms, most farmers raise milch cows and beef-cattle primarily, with sheep, hogs, and chickens as secondary sources of income. Very few farmers concentrate on sheep, hogs, or chickens.

The main sources of farm income in the Central Division are: (1) Fluid milk, most of which is shipped to Hagerstown, and Waynesboro, Pennsylvania. No milk is sold in the Washington, D.C. area, because of that city's particular sanitation requirements with regard to milk, (2) Beef-cattle which are usually raised by breeders and not feeders, are shipped to Hagerstown and Baltimore, (3) Sheep and hogs, which follow marketing channels similar to those of the beef-cattle, (4) Poultry and poultry products which are sold locally or shipped to Hagerstown, Waynesboro and Baltimore, (5) Grains, mainly wheat.

Three farms have been selected as examples of the previously mentioned types. They will be designated as the farms of E, F, and G (Table 15).

Mr. E came from Pennsylvania in the late 1930's and settled on a farm located two miles south of the Pennsylvania Boundary Line, on the Hagerstown-Waynesboro road. He and his family of nine, lives on this farm, which he owns and operates. The farm consists of sixty acres, of which forty -five are in grain, ten in pasture and five in woodland.

The grains Mr. E grows are corn, wheat, barley, and oats. He rotates his fields on a three to four year system and uses chemical fertilizers 3-12-6, in the amount of 300 pounds per acre, and the collected manure from the barn. He raises fifteen head of beef-cattle, fifty hogs, sixty sheep, and a thousand chickens. The eggs are sold on the farm or sent to Waynesboro, and the livestock is shipped to Hagerstown or Baltimore. As he does not produce enough to feed his livestock, he buys substantial quantities of grain and all his needs of mixed proteins.

Mr. E's family performs the necessary labor throughout the year, so that he does not need to hire additional labor, particularly since his farm is well-equipped with agricultural machinery.

There are no serious problems of erosion, gullying, etc. on the farm, except for a slope next to the house. This slope is kept in permanent pasture to check erosion.

Mr. F maintains a farm in the Chewsville District, two miles south of the town of Chewsville. It includes 160 acres

Photo 7. Milch cows on a dairy-farm north of Hagerstown.

Photo 8. A dairy-farm and farm equipment in Chewsville District, the Central Division.

of rich land: 140 in grains and twenty in pasture. He grows corn, wheat, barley, and oats to feed his twenty milch cows and seventy-five hogs. In order to assure better crops and richer pastures he used 300 pounds of 3-12-6 per acre and rotates the fields on a 3-year system. The milk, from which most of his income is derived, is shipped to Hagerstown.

Mr. F operates the farm as a share cropper on a 50-50 basis. There is no need for hired labor, because he and his wife do all the farm work efficiently, by using farming and dairy machinery.

Mr. G, his wife, and two children live on a farm located three miles south of Funkstown on Route U.S. 40. The farm is owned by a landlord to whom Mr. G pays rent. The farm consists of 107 acres: 87 of which are in grains and the rest in pasture. Mr. G grows corn, oats, barley, and hay, and uses the same rotation system as E and F, except that for fertilizer he uses on an average 225 pounds per acre of 3-12-6.

Mr. G raises fifty-three head of cattle--thirty milch cows and twenty-three beef-cattle--and fifty chickens. His farm is completely mechanized and modern, and the milk is sold as grade A in Frederick.

WESTERN DIVISION

This Division covers the farm land located from Powell Mountain westward. There is great diversity in land forms - high ridges and narrow valleys; with resultant variation in micro-climatic conditions and soils. The growing season is shorter by 15 to 25 days than in the other Divisions. Soils

are poor and shallow. They are mostly Dekalb shale loam and Berks shale loam. Variations in land forms and in micro-climate cause variations in land use. All fields at low elevations are used for dairying, general farming, and vegetables. Land at higher elevations, 700-900 feet, is used for fruit trees. Steep slopes, summits, and upper slopes are in forests.

In the Hancock District dairy and general farming are insignificant when compared to fruit farming, as grain and pasture acreages are limited. More sheep and hogs than cattle are raised. Indian Spring District is somewhat more important as a dairy and general farming area, although such farms are usually small and most of the produce is consumed on the farms or sold locally. Consequently the Western Division could be characterized as a fruit farming area, with concentration in the Hancock District. The orchards of this District are of the commercial type. They occupy large blocks and include only apple and peach trees (for further discussion see Chapter VIII). Most of the orchards in the Division are owned and operated by five growers who are the largest fruit producers, not only in the County but in the State as well. The size of holdings of orchards here is far greater than in any of the other divisions. Because fruit production is large, the growers own not only the orchards but also cold-storage facilities, packing and shipping equipment, and motor-trucks. In many respects, fruit growing is remarkably different in the Western Division from that in the Eastern Division, such as in regard to the size of the orchards,

Photo 9. In the Western Division, few farm-houses occupy a valley where grain fields and pasture land are found. Note the orchard in the background.

Photo 10. Diversity in land use in the Western Division. Small farm house and a small field used for production of grains; orchard planted on most of the slope; the crest of the hill is left in woods.

the concentration on apples, and type of orchard management.

Because of the small number of fruit growers in this Division one example will be sufficient. An example of general farming is unnecessary, because this type of farming is relatively insignificant and farming practices, though on a smaller scale, are substantially the same as on this type of farm in the Central Division, for which examples have already been cited.

Mr. N (Table 15) owns and operates 800 acres of orchards. A large percentage of his fruit trees are apples, and the rest peaches. His orchards which are scattered west and east of Hancock are mostly in large blocks, and have been divided into five sections, each supervised by a foreman. Various jobs, such as spraying, fertilizing, pruning, etc. are done by farmers, who are actually farm laborers, and have no direct concern with production, expenses, management, and the like, because they are paid monthly wages. In addition, Mr. N has provided them with rent-free houses, utilities, and small vegetable gardens. The houses have been built on the various blocks to be occupied by the farmers who work on these blocks. For each block Mr.N has built (i) a pumping station for spraying, (ii) a large barn to house the equipment, and (iii) a pond or reservoir to assure a water supply sufficient for the spraying program.

Harvesting, storing, and shipping is mostly done with Mr. N's own equipment and trucks. If extra equipment and trucks are needed during the harvesting period, they are rented.

Prior to 1900 wheat was the major cash crop produced in Washington County. Other grains, corn, oats,and rye were

grown for feed. Livestock ranked secondary to grains, while fruit was the least important insofar as dollar value was concerned. During the past fifty years, 1900-50, the acreage of wheat has decreased substantially, and barley is the only grain which has shown a great increase in acreage. At the same time, livestock has become much more important, dairy and beef-cattle in particular, and fruit has gained greater significance in acreage, production and dollar value. At present, the agricultural pattern of Washington County indicates the significance of livestock and livestock products from a cash value standpoint. Fruits rank second, grains third. Dairy and beef-cattle farming are predominant in the Central Division. Fruits and livestock are almost equally important in the Eastern Division. Fruit is the major crop in the Western Division. The present agricultural pattern, very likely, will show no major changes in the near future.

In this Chapter, the significance of the various agricultural products in relation to each other and to the agricultural pattern of the County, was presented. The following chapter will treat the physical and economic conditions that affect the fruit industry. This industry was selected, because its products are mainly for sale in markets outside the County. In other words, fruit usually brings more money into the County than any other crop. Besides, Washington County ranks first in fruit, namely apples and peaches, among the counties of the State. The fruit industry is, therefore, a principal economic factor in a study of areal differentiation and is given special attention in the following chapters.

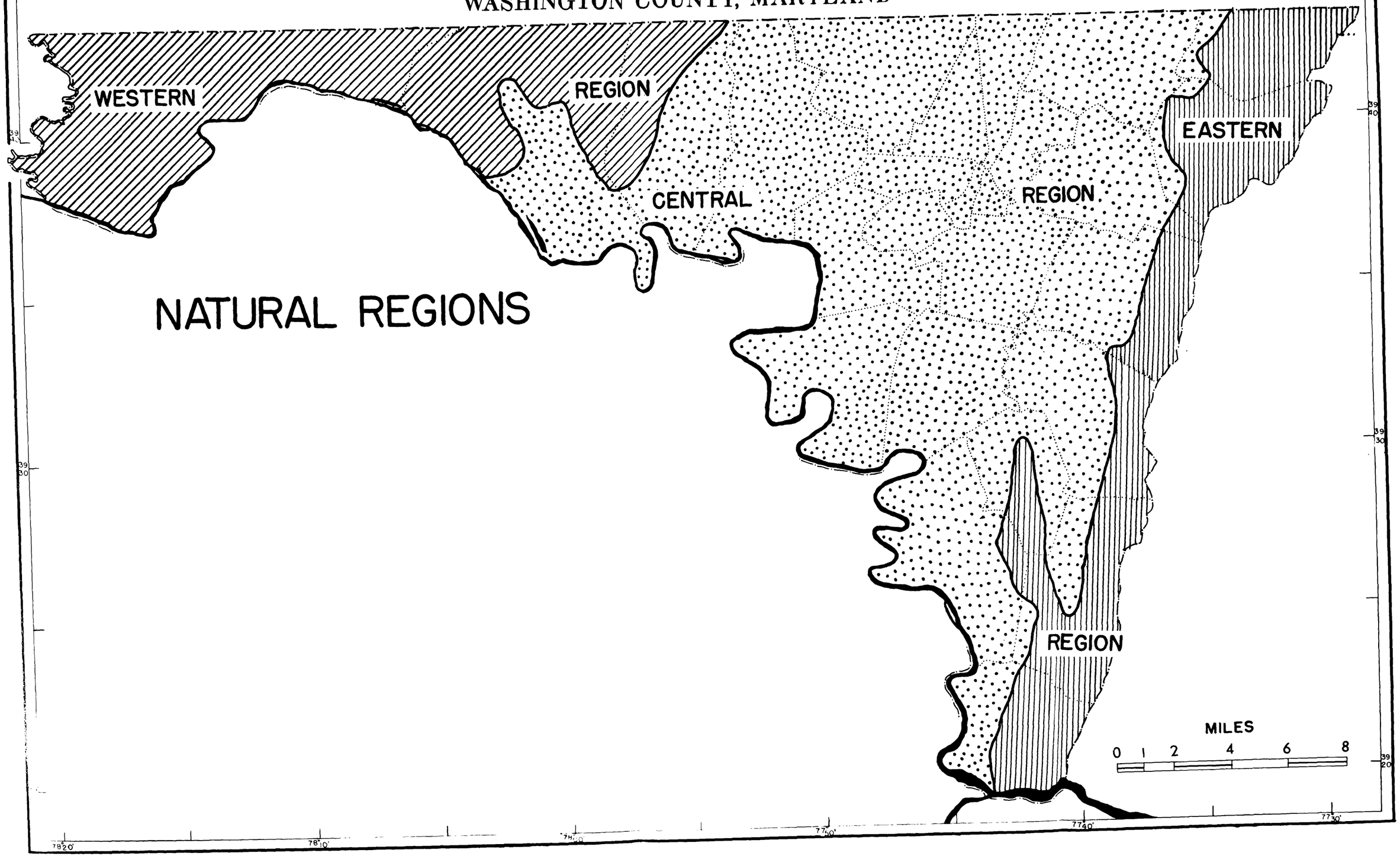
Plate 6

Natural Regions

PLATE 6

WASHINGTON COUNTY, MARYLAND

NATURAL REGIONS



CHAPTER VIII

FRUITS

KINDS, VARIETIES, DISTRIBUTION AND TREND

The development and present importance of fruit growing have been discussed briefly in relation to the general agricultural conditions of Washington County, as well as the general geographic distribution of the industry. In Chapters VIII, IX, and X, a systematic study of the fruit industry will be presented in order to analyze the various physical and economic factors that affect fruit production in the different sections of the County.

Fruit growers in Washington County produce apples, peaches, pears, cherries, plums, and grapes as well as berries, such as strawberries, raspberries, and blackberries. Only apples, however, showed a larger number of trees and a higher production figure in 1950 than in 1900. Other fruits showed considerable decrease in number of trees, such as peaches, grapes and pears. Peaches maintain an important position, second to apples, in the fruit industry of Washington County.

According to a recent survey, there are about a dozen important apple varieties in the orchards of Washington County.[1] These varieties are classified as follows:

1. Summer varieties: Transparent, Williams, Rambo, and Lowry.

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[1] C.W. Porter and A.R. Miller, "Maryland Fruit Tree Census and Marketing Survey", College Park: March 1950, p.13

2. Fall varieties: Red Delicious, Jonathan, Golden Delicious, and Grimes Golden.

3. Winter varieties: York Imperial, Stayman, and Rome Beauty.

York Imperial was and still is the leading variety in Washington County (and also in the State of Maryland), although in recent years the Delicious varieties have been planted rather widely. In 1949, York Imperial accounted for one-fourth of the total number of apple trees in the County (and one-fifth of the State total).[1] Almost one-third of this variety consists of the improved type, called "red strain" or "Red York". The Red York was introduced in this area as early as 1930, but the total number of trees of this variety remained small until 1945. Since then it has become increasingly important and popular. Therefore, many of the Red York trees are not yet of bearing age, one to five years old.[2] At present the fruit growers in the County favor the Red York, because it maintains the major characteristics of the parent variety, thriftiness and hardiness, and produces better finished crops. York Imperial trees are mostly over fifteen years old and over one-half of the trees are thirty years old or older. Although this variety is noted for its long bearing period, thirty years is the average of the profitable

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[1] Ibid., pp. 13 and 54.

[2] Ibid., p. 54. The Table shows that about 13,000 trees out of 17,000 were 1-4 years old and none are over 20 years old.

production period, and, therefore, by 1960 most of these trees will be non-productive. In general, York Imperial trees are vigorous and large, but with a strong tendency to heavy production in alternate years. Age at the time of first bearing and total productive age vary, under different climatic and soil conditions.[1] In regard to the characteristics of York Imperial, Porter and Miller state: "Trees of this variety are thrifty and hardy; under Maryland conditions, they usually remain productive for a longer period of time than the other common varieties."[2] Concerning future trends they add: "However, it is questionable whether the present rate of planting is heavy enough to ensure sustained future production."

Stayman is the second leading variety in the commercial orchards of Washington County, and also of the State. This variety accounted for 15.5 per cent of the total apple trees in the County in 1949 (Table 16). Almost one-third of the Stayman trees are twenty years old or older. The Red Stayman includes over one-half of the trees of this variety, mostly young trees, one to ten years old. The Stayman tree, like York Imperial, is vigorous and large, but it bears sooner and it has a more even production from year to year. With regard to the characteristics and future trend of this variety

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1 J.R. Magness, "Apple Varieties and Important Producing Sections of the United States", U.S. Department of Agriculture, Farmers' Bulletin No. 1883, Government Printing Office, Washington, D.C.; 1941, p.23.

2 C.W. Porter and A.R. Miller, op. cit., p. 15

Table 16 - Apple Trees of Leading Varieties in Commercial Orchards in Washington County in 1949, by Age and Characteristics*

Variety	Trees in 1949		No. of trees indicated Age		Major Characteristics of Variety			
	estimated number	Percent of total	1 - 14	15 and over	vigor of tree	ultimate size of tree	Age of ** first bearing	Tendency to produce
York Imperial	47,000	20	2,500	44,500				
red strains	17,000	7.4	16,000	3,000	vigorous	large	6 - 8 years	biennial
Stayman	25,000	10	5,000	20,000				
red strains	14,000	5.5	13,000	1,000	vigorous	large	4 -6 years	annual
Delicious	15,000	6	1,000	14,000				
red strains	16,000	6.3	14,000	2,000	vigorous	large	5 - 8 years	inter-mediate
Rome Beauty	8,000	3.1	3,000	5,000				
red strains	15,000	6	14,000	1,000	medium	medium to small	4 - 6 years	annual
Jonathan	10,000	4	1,000	9,000				
red strains	6,000	2.4	6,000	-	medium	medium	4 - 6 years	annual
Golden Delicious	14,000	5.5	12,000	2,000	medium	medium	4 - 6 years	inter-mediate
Grimes	12,000	4.6	1,500	10,500	medium	medium to large		inter-mediate
Transparent	4,000	1.6	2,000	2,000	medium	medium to small	4 - 6 years	biennial
Ben Davis	4,000	1.6	-	4,000	medium	medium	4 - 6 years	annual

* - Sources: 1 - C. W. Porter and A. R. Miller, Maryland Fruit Tree Census and Marketing Survey, Table on p. 54

2 - J. R. Magness, Apple Varieties and Important Producing Sections of the United States, Table on p. 23.

** - In Washington County, the climatic and soil conditions delay this age by 2 years in the Eastern Division and by 4 years in the Western Division; and total life by 10 - 12 years.

Porter and Miller state: "The rate of planting has been steadier than in case of the York, but the Stayman is not considered as hardy a tree. It is likely that some future decline in production will take place."[1]

Delicious, Rome Beauty and Jonathan are other leading varieties. Each accounted for over 15,000 trees in 1949 Table 16). During the past thrity years, the parent varieties have dropped out of positions of leadership and been replaced with improved type of trees such as those called "red strains". Delicious in particular has recently become a less desirable variety, and many growers are replacing it by other varieties which bear better finished crops such as Golden Delicious, Stayman, York, and Red Jonathan. Most of the Rome Beauty trees are of prime bearing age, and older, because no replanting has been done during the past ten years. But Red Rome Beauty became quite popular after 1940. (Compare in Table 16 the figures of Rome Beauty with Stayman on the one hand and those of Red Rome with Red Stayman on the other.) From these figures it is obvious that in the near future Rome Beauty will drop out of commercial production, to be replaced by Red Rome as the second most common variety in the County. A great many of the Jonathan trees are in the last stages of commercial production, as they are thirty years old or older. Very limited replanting of this variety has taken place, with the exception of the Red Jonathan tress which have almost doubled in number during recent years. As this variety is

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[1] Ibid., p. 15

desirable as a pollenizer it has maintained its place in the orchards, but it is expected that production and number of trees of this variety will decline.[1] Because of high frost resistance, fine finished crops, and its value as a pollenizer, Golden Delicious has become a desirable variety in the County, particularly in the Western Division. Characteristics of this variety, as well as of others such as Grimes Golden, Transparent, and Ben Davis, are shown in Table 16. Shape of the trees varies from the wide-spreading tree of the Stayman, Rome Beauty, Grimes Golden, and Golden Delicious, to the upright-spreading tree of the York Imperial, Delicious, Transparent, and Ben Davis. The most desirable shape is the wide-spreading, because this shape facilitates spraying, pruning, fruit thinning and harvesting. Consequently, the commercial apple growers prefer to grow wide-spreading rather than upright-spreading varieties, in order to reduce the cost of production and to secure better control of diseases and insects which, in turn, affects the quality and the quantity of the crop.

The characteristics of the apple varieties have great significance from the standpoint of orchard management. The trees of very vigorous growing varieties usually attain large size (see Table 16) and, therefore, should not be planted as close as trees which attain only medium size. There is also a relationship between the age of first bearing and the regularity of bearing in any variety. The higher the age of first bearing, the stronger the tendency toward biennial production.[2]

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[1] Ibid., p. 15

[2] J.R. Magness, op. cit., p. 22

Although many peach varieties are grown in the United States, only about fifteen are grown in Washington County.[1] Five of these have taken the leadership in the orchards of the County: Elberta, Halehaven, Shipper's Late, Golden Jubilee, and J.H. Hale. They are selected by growers according to their suitability to local climatic conditions and the purpose for which the peaches are produced. Sullivan Elberta, Early Elberta, Hiley, and Sunhigh have been developed during the past 30-year period, through breeding to suit the physical conditions and the market in the Central Atlantic States, but they are still rather minor varieties in Washington County from the standpoint of number of trees and production.

Elberta is the most heavily planted variety in Washington County (Table 17). Elberta trees were estimated in 1949 to constitute over forty per cent of the number of peach trees in the County, Almost one-third of the trees of this variety is over fifteen years old. Planting of this variety in 1943-46 was far below the level of the preceding two years, i.e., only one to four.[2] This reflected in part the inclination of the growers to other varieties, such as J.H. Hale, and in part the general decline in total number of peach trees in the County after 1945. However, Elberta will maintain its status as the most common variety for many years to come, because

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[1] 48 peach varieties are considered the outstanding ones by the Bureau of Plant Industry.

[2] C.W. Porter and A.R. Miller, op. cit., p. 54

more than two-thirds of the trees are less than fifteen years old. The age of first bearing of Elberta, as for other varieties, is from two to five years, and profitable production continues till the age of twenty to twenty-five years.[1] This means that for peach trees the time of first bearing comes five years earlier, but the profitable production period is fifteen years shorter than for apple trees.

Elberta, which ripens in the middle of the peach season, is considered the standard variety. Other varieties are referred to as "early", "late" or "midseason" depending upon their time of ripening in relation to that of the Elberta. Early varieties ripen one week before Elberta; midseason varieties ripen within a range of nineteen days, three before and sixteen days after the Elberta; and late varieties ripen at least two weeks after the Elberta.[2] In regard to the ripening dates of peach varieties Havis says:

> The ripening dates of early ripening varieties and those of late ripening varieties vary considerably from year to year in relation to Elberta, but the

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[1] Peach trees in Maryland bear when they are 2-4 years old. Two more years are needed for full crops. Profitable production continues until the trees are 25 years old. To the South of Maryland, in North Carolina, South Carolina and Georgia, the maximum profitable age is 10-15 years. North and west of Maryland, in Ohio, Michigan, Washington, and California, the commercial productive age is longer, 35 years. The difference in period of commercial productivity is a result of two factors: (i) prevalence of diseases, (ii) warm weather and drought frequency.

[2] The harvesting period of Elberta is the middle of August.

> dates of the varieties in any one of five groups are fairly uniform as related to each other. For example, the ripening dates in any one year for Dixigem and Redhaven may differ from that of Elberta by several days more or several days less than 33 and 31 days, respectively, but are usually 2 days apart. /1/

The Elberta trees are large, productive, vigorous and suitable for many soils and climatic conditions, but their flower buds are sensitive to low temperature. Peaches of this variety are large, have good skin coloring (blush), and yellow flesh of fair to good quality. Because of such characteristics, Elberta became popular with the growers, but it is losing ground in the orchards of the County to other varieties which are superior in quality, hardiness, and skin color.[2]

Halehaven is the second leading variety. Most of the trees of this variety in the County are over five years, but none is over fifteen years old (Table 17). This means that most of the Halehaven trees are in their prime bearing period. Since 1946 new plantings of this variety have declined because the skin color of its fruit, which is sometimes dull, makes it less desirable to the ultimate consumers. Consequently, growers began to favor new varieties such as Sullivan Elberta, Early Elberta, and Rio Oso Gem which are recommended as eating or table peaches, and Halehaven which is considered better for canning. This latter variety has been developed recently and was introduced to the commercial orchards in 1940. Halehaven trees, like Elberta Trees, are vigorous and productive,

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1 Leon Havis, "Peach Growing East of the Rocky Mountains", U.S. Department of Agriculture, Farmers' Bulletin No. 2021, Government Printing Office, Washington, D.C.: 1951, p.6.

2 Ibid, p. 8

and have fairly hardy flower buds.[1] Characteristics and principal use of the fruit are listed in Table 17.

Shipper's Late is the variety which ranks third in the County (and sixth in the State) in number of trees. This variety is not so common on the Eastern Shore as in Western Maryland. The trees of this variety are of more even age than the others, and are mostly prime bearing trees.[2] In this respect it resembles Halehaven, except that one-fourth of its trees are over fifteen years old. Because the fruit ripens rather early, is large, and of good eating quality, the variety is grown on a commercial scale for large markets rather than for local sale.

Golden Jubilee was planted in Washington County mainly between 1935 and 1945. Thus the trees are at present of bearing age. This variety usually ripens three to four weeks before Elberta, and its fruit is attractive with red and yellow color, but not firm enough for distance shipping. Consequently it is sold in nearby markets (see Table 17).

Of other varieties, with the exception to J.H. Hale, there are less than 6,000 trees in Washington County. Sullivan Elberta and Early Elberta have become more popular during the past five years, because of the superior characteristics of their crops. The fruits of Sullivan Elberta ripen at least

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[1] Ibid., p. 8

[2] C.W. Porter and A.R. Miller, op. cit., p. 25.

Table 17 - Peach Trees of Leading Varieties in Commercial Orachards in Washington County in 1949, by Age and Characteristics*

Variety	Estimated number	Percent of total	No. of trees of indicated age: 1 - 5	No. of trees of indicated age: 5 and over	Major Characteristics of Variety: Ripening date (days)	Fruit Size	Color of Flesh	Principal Use
Elberta	66,000	40.0	9,500	56,600	0	large	yellow	C.
Halehaven	17,000	10.0	2,000	15,000	- 14	large	yellow	H., L. and C.
Shipper's Late	13,000	9.0	3,000	10,000	+ 3	large	yellow	C.
Golden Jubilee	12,500	8.5	1,500	11,000	- 26	medium	yellow	L.
J. H. Hale	10,500	7.5	2,000	8,500	+ 2	large	yellow	C.
Georgia Belle	6,000	4.0	1,000	5,000	- 7	med. to large	white	L. and C.
Brackett	3,000	3.5	500	2,500	+ 8	large	yellow	C.
Sullivan Elberta	3,000	3.5	3,000	-	- 7	large	yellow	C.
Early Elberta	2,500	3.0	1,000	1,500	- 4	large	yellow	C.
Hiley	2,000	3.0	500	1,500	- 13	med. to large	white	C.
Sunhigh	1,000	1.5	1,000	-	- 16	large	yellow	C.
Triogem	500	0.7	-	500	- 22	medium	yellow	L. and C.
Rio Oso Gem	500	0.7	500	-	+ 5	large	yellow	C.

* - Sources: 1. C. W. Porter & A. R. Miller, Maryland Fruit Tree Census and Marketing Survey, Table on p. 54

2. Leon Havis, Peach Growing East of the Rocky Mountains, pp. 5 - 10.

H = home; L = local market; C = Commercial market.

one week earlier than Elberta, and are similar to Elberta in many respects such as size, flesh color, and quality. This variety is more common in the warmer areas, of the south-eastern part of the country. Early Elberta, which produces attractive fruit, is another new variety. Its importance as a commercial variety lies in the fact that it ripens just before Elberta, and is more attractive.[1] (see Table 17 for some other varieties grown in Washington County).

In the Eastern and Western Divisions, the main fruit producing sections of the County, orchards are scattered over the foothills of mountains and ridges. The orchards are distributed unevenly as they tend to be concentrated in sections where land forms, micro-climate, and soils are suitable. Although the total number of fruit trees in the County decreased from 612,000 in 1945 to 514,000 in 1950, the 1945 data were used for this analysis, and also for Plates 7 and 8 because data by minor civil divisions are not available for 1950.[2]

Plates 7 and 8 show the distribution of apple and peach trees in Washington County in 1945. Since apples and peaches are by far the most important fruits in the County, this discussion is concerned only with these two kinds. Other fruits grown in the County are pears, plums, cherries, and grapes, but compared to apples and peaches their acreage, production, and cash value are insignificant. Besides, their general pattern of distribution is similar to that of apples and peaches.

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[1] L. Havis, loc. cit.

[2] The source of these figures is unpublished tables of U.S. Census Bureau.

Plate 7

APPLE

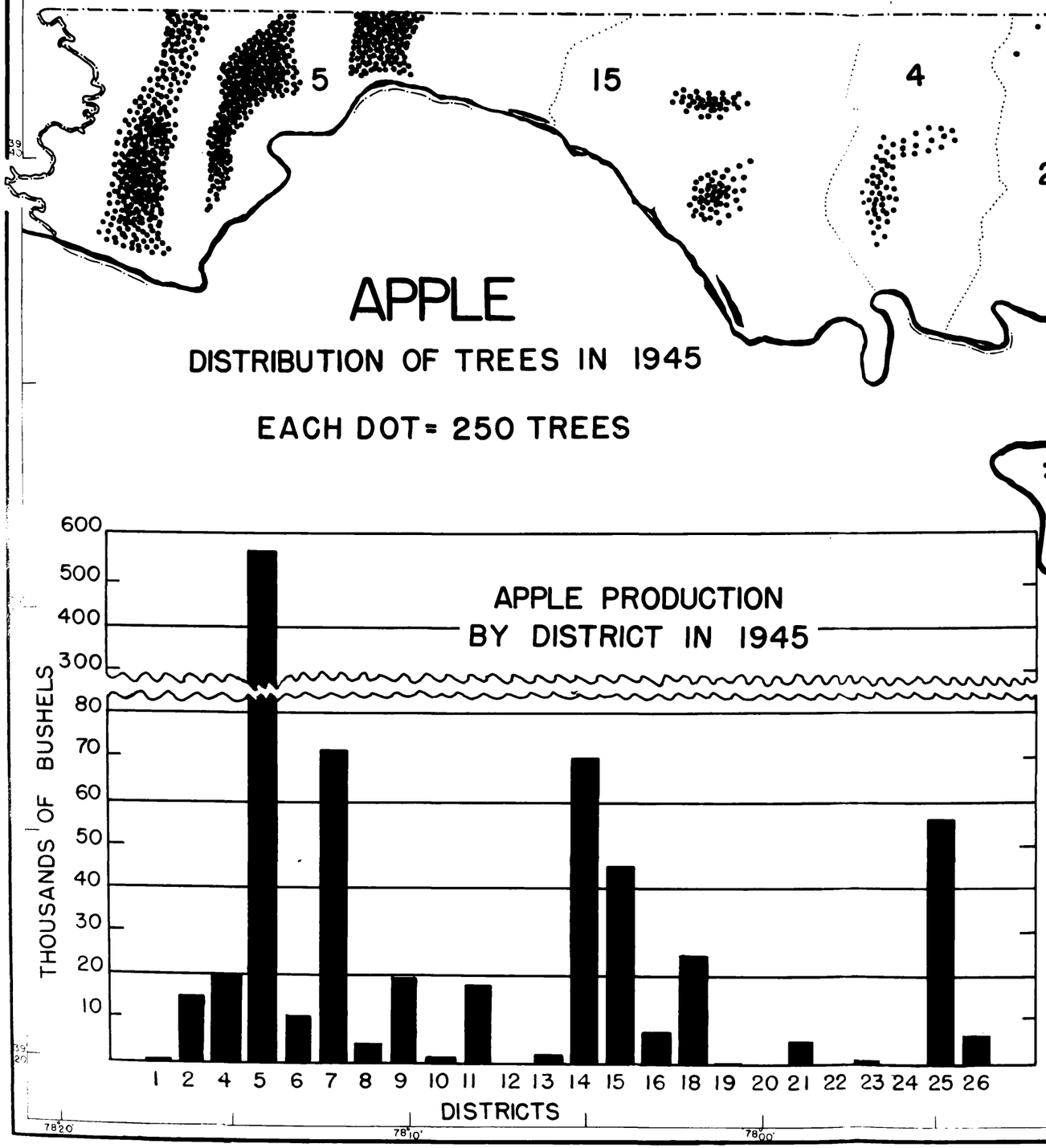
Distribution of
Trees in 1945

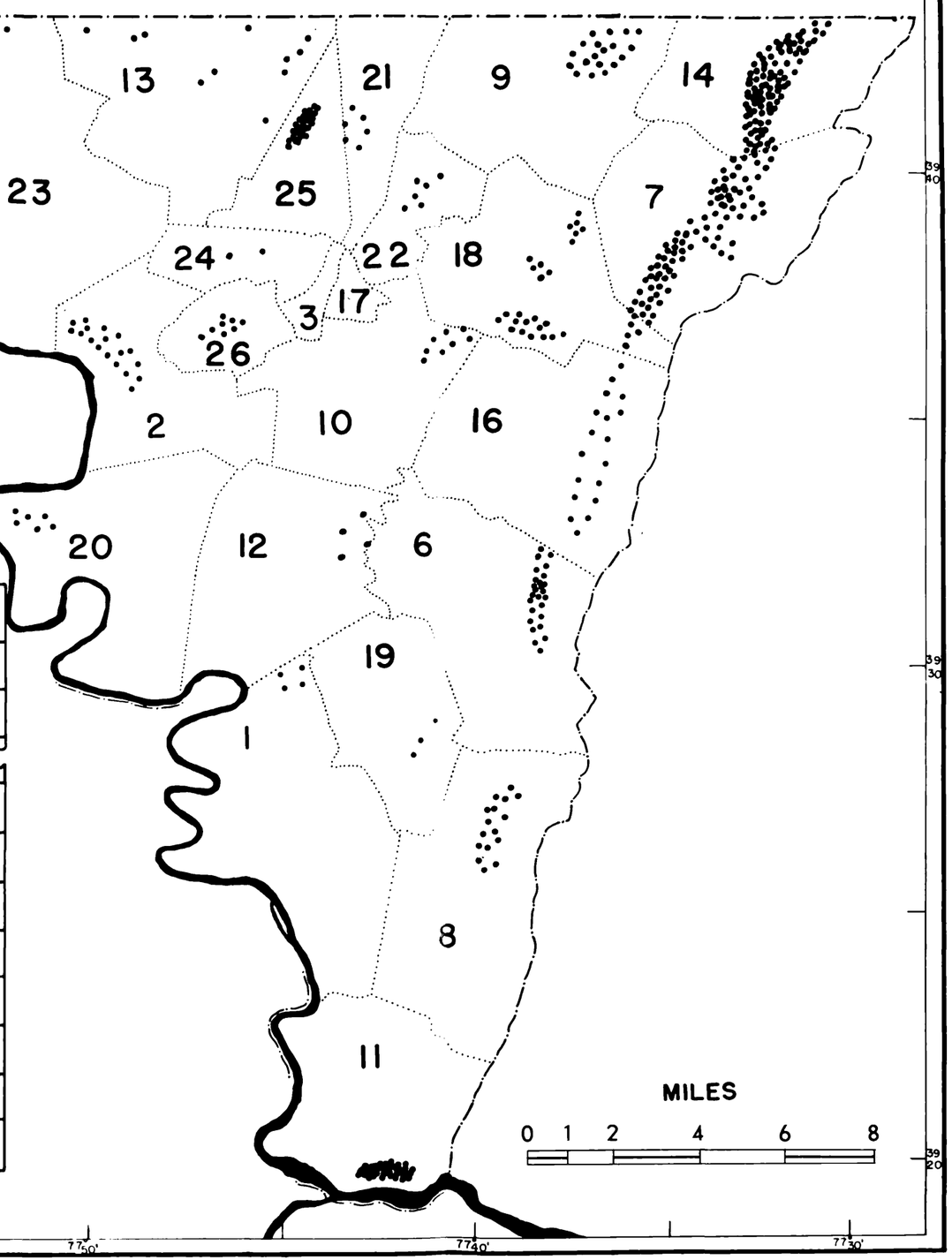
WASHINGTON COUNTY, MARYLAND

APPLE

DISTRIBUTION OF TREES IN 1945

EACH DOT = 250 TREES





The map of distribution of apple trees (Plate 7) shows distinctly the heavy concentration in the Hancock District, of almost sixty per cent of the total trees of the County. Furthermore, a large percentage of the trees (174,550 in 1945) are located within a small area, east and west of the town of Hancock. The second largest area of concentration is the Ringgold-Cavetown area which includes the eastern parts of the Ringgold and Cavetown Districts. The total number of apple trees in this area is 44,867, Ringgold having 22,741 and Cavetown 22,126. The third largest apple producing area is situated in the two districts of Indian Spring (17,029) and Clear Spring (15,184). This section, together with the Hancock District, forms the area referred to as the Western Division. It will be referred to here and later as the Hancock area. In other words, five districts: Hancock, Indian Spring, Clear Spring, Ringgold,and Cavetown, reported three-fourths of the total 334,247 apple trees in the County in 1945.

Plate 8 shows concentrations of peach orchards similar to that of apple orchards. The major areas of concentration, however, are different. The leading area in total number of peach trees is the Ringgold-Cavetown area, with 95,624 trees in 1945, of which 28,809 in Cavetown. The second area of importance is the Hancock area with 62,236 trees in 1945; 57,179 in Hancock, 3,491 in Indian Spring and 1,566 in Clear Spring. These five districts included two-thirds of the total peach trees in the County. Most of the rest are located in the districts of Boonsboro, Keedysville, and Rohrersville; 18,844,

Plate 8

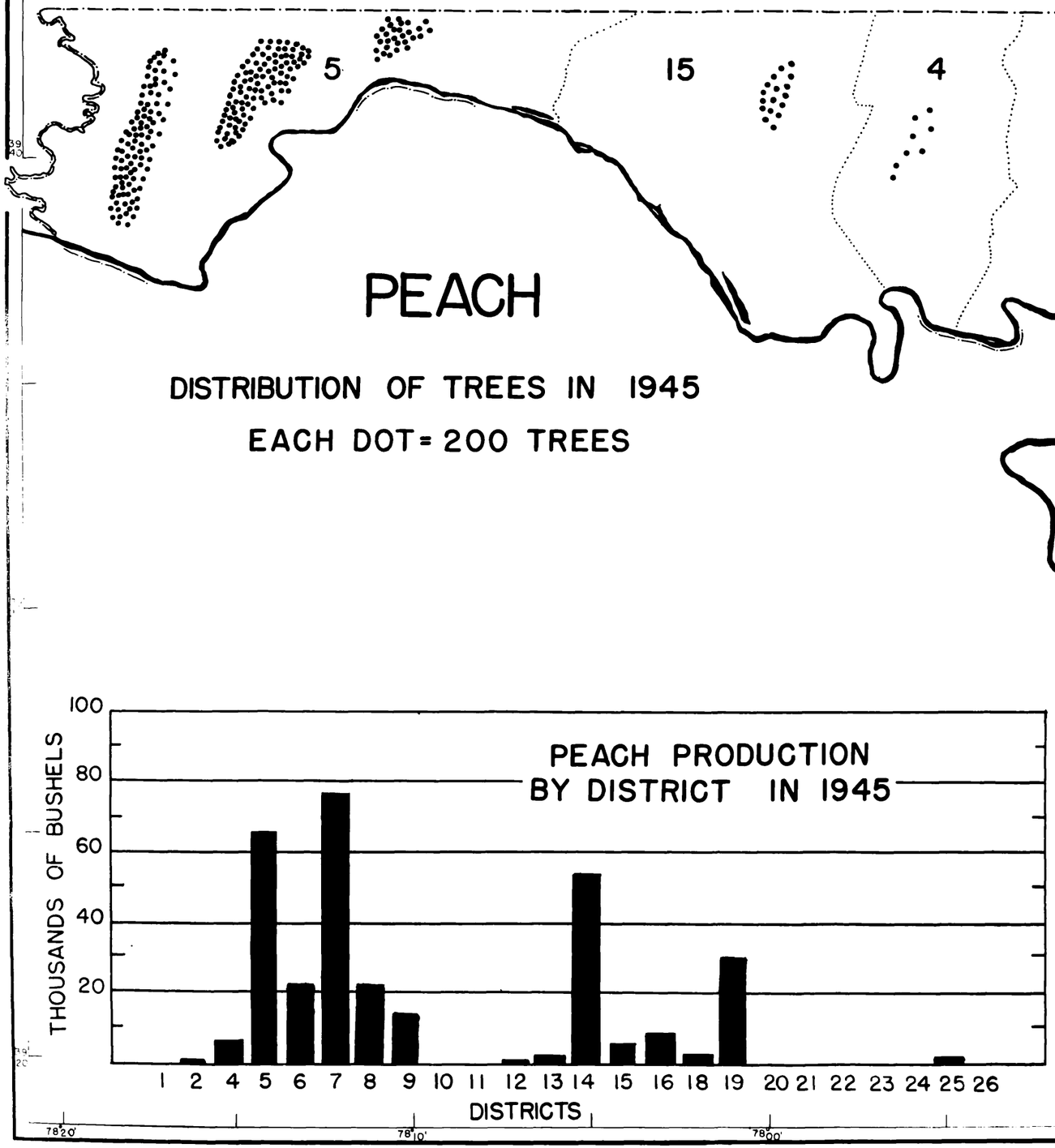
PEACH

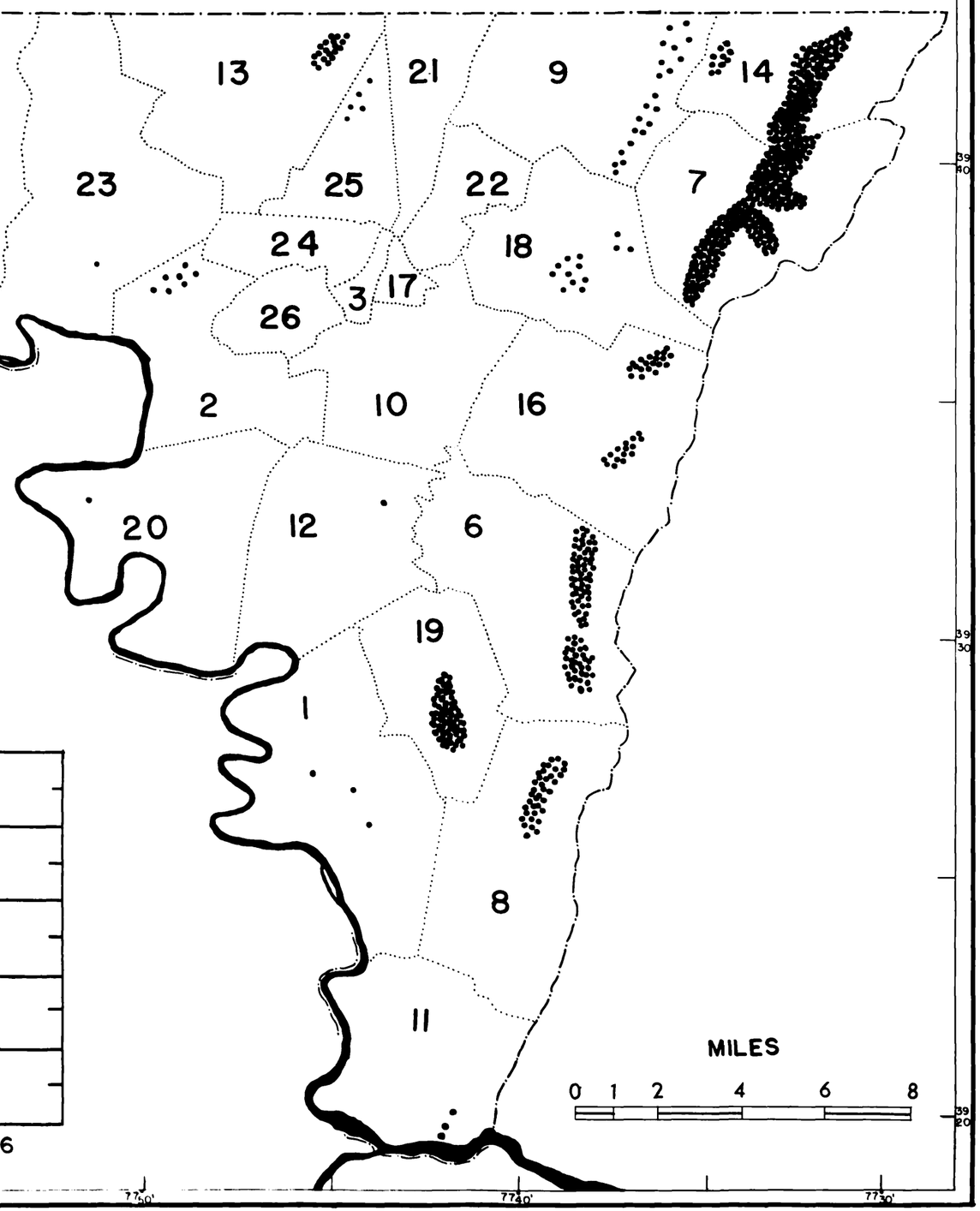
Distribution of
Trees in 1945

PEACH

DISTRIBUTION OF TREES IN 1945

EACH DOT = 200 TREES





15,933, and 7,134 respectively. One distinctive difference in the concentration of apple and peach trees shows up remarkably well on Plate 5, namely that in the Hancock District there are three times as many apple as peach trees, while in the Cavetown District the situation is reversed. One reason is that peach blossoms are sensitive to low winter temperatures which occur more frequently in the Hancock District. Another reason is that the nature of peach growing necessitates smaller orchards, which are predominant in the Ringgold-Cavetown area. The Hancock area is the center of commercial orchards and is made up of large land holdings. Commercial fruit growers in the Hancock area avoid planting large acreage in peaches, in order to avoid the high pressure for labor during the harvest. Peaches must be picked and shipped as soon as they are ripe, as any delay results in considerable spoilage. Apples, on the other hand, may be harvested over a longer period of time and only limited damage results in case of a short delay in harvesting or shipping. Apples can be put in cold-storage for a long period of time, almost a year, while peaches must be shipped almost directly from orchard to market or processor, regardless of the current price. In other words, apple growers have more control over the distribution and marketing of their crops than peach growers, and can benefit from after-season higher market prices. Therefore, the large growers in the Hancock area who have extensive orchards and cold-storage facilities, are more interested in apples. Most of the peaches are produced by the small growers of the Ringgold-Cavetown area and other fruit sections of the County.

TABLE 18. Leading Districts in Grapevines, Pear, Plum and Prune and Cherry trees in Washington County in 1945.*

District	Pear	Plum and Prune	Cherry	Grapevines
Washington County	11,168	4,229	9,113	5,898
District 4 Clear Spring	-	-	1,243	-
District 7 Cavetown	5,069	1,543	4,114	701
District 11 Sandy Hook	3,373	-	-	-
District 14 Ringgold	-	1,818	-	2,858

*Data are not available for 1950.

Source: U.S. Census Bureau

The distribution of the other fruits, pears, plums, cherries, and grapes, also shows sectional concentration in the County. Table 18 presents the leading districts for these fruits. Two-thirds of the pear trees are located in the Cavetown and Sandy Hook Districts. More than two-thirds of the plum trees are found in the districts of Ringgold and Cavetown. One-half of the grapevines are located in the Ringgold District, with a smaller concentration in Cavetown. Almost forty per cent of the cherry trees of the County are

in the Cavetown District, Clear Spring District ranking second in importance. This Table shows that Cavetown District leads in pears and cherries, and Ringgold District in prunes and grapes. In Washington County these fruits usually occupy small patches in the apple and peach orchards.

The general picture of the development of the fruit industry in Washington County prior to 1900 was presented in the preceding chapter. Here, the discussion will include the trends of the major, as well as the minor types of fruits from 1900 to 1950. The Census of 1900 was the first one to include complete data regarding the different kinds of fruits grown in the County, such as apples, peaches, pears, and cherries. The general picture of the fruit industry in 1900 was as follows:

Although there were over a million[1] fruit trees in the County in 1900, the value of all orchard products was only slightly over $90,000. Apples were the major fruit as far as the production was concerned. Although the County ranked first among the Maryland counties in number of apple trees (180,000), it ranked fourth in apple production (260,000 bushels). The three leading counties were, in order, Baltimore, Frederick, and Carroll. Peach production of the County in 1900 (1,400 bushels) was very low, in comparison with the number of trees and the other leading peach-producing counties in Maryland, such as Kent, Dorchester, and Queen Anne, due to unusually low temper-

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[1] Apple trees, 180,000; peach trees, 828,000; pear trees, 25,000; plum and prune trees, 26,000; cherry trees, 10,000; and grapevines, 88,000.

atures during the winter of 1899 (18 F below zero) which caused great damage to peach trees of the County. In production of other fruits, Washington County ranked first only in prunes, but it also ranked first in number of grapevines. These facts indicate that Washington County in 1900 was one of the important Maryland counties in total number of fruit trees and fruit production, although it did not lead at that time in any of the major fruits. Apple and peach production increased after 1900, and since 1925 Washington County has been the leading producer of apples and peaches in the State of Maryland.

The trend in the number of apple trees from 1900 to 1950 as shown in Graph 1 indicates a net increase for the period. From 1910 to 1925, there was a steady rise, followed by a downward trend to 1940. The increase in the number of trees between 1940 and 1945 was the result of high market prices for apples which encouraged growers to plant more trees. After 1945 the number of trees decreased again, although the total in 1950 was higher than in 1940. It seems very likely that the downward trend will continue during the next ten years. The trend in number of apple trees during the past fifty years showed a continuous increase between 1900 and 1925, with one exception in 1910, and a continuous decrease from 1925 on, with a slight deviation from the general trend between 1940 and 1950.

The trend in apple production for the same period, however, is quite different. If the production figures for 1900, 1925, and 1950 were used in plotting a graph, the result would be a rather straight line showing a steady and continuous incline

from 1900 to 1950. The increase in production between 1900 and 1925 coincides with the increase in number of trees, but the continuing increase in production after 1925 despite the decrease in number of trees clearly indicates a substantial increase in yield per tree.[1]

Figures of yearly apple production for Washington County from 1900 to 1950 are not available, but to show fluctuations in production from year to year, the figures for Maryland will serve since Washington County has produced an increasing proportion of the total Maryland production (12 per cent in 1900, 25 per cent in 1925, and 55 per cent in 1950). In general, the figures seem to indicate that high production occurs in alternate years, that is high production in one year is frequently followed by a substantially lower production the following year.[2] This fluctuation is related to the fact that for all apple varieties, if they are planted in an area where complete crop failure from spring frosts occurs during certain years, as in Washington County, the trees show a pronounced tendency to produce heavily in alternate years.[3]

The trend in number of peach trees for Washington County

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1 Apple production in 1900, 1925 and 1950 was 276,000, 415,000 and 685,000 bushels, respectively.

2 For example, production in 1900, 1901, 1902 and 1903 was (thousands of bushels) 2,700, 1,900, 2,000 and 2,700, respectively. And production in 1942, 1943, 1944 and 1945 was (thousands of bushels) 2,211, 864, 1,895 and 702 respectively. (Source: C.W.Porter and A.R.Miller, op. cit., p.56)

3 J.R. Magness, op. cit., p.22

between 1900 and 1950 is also shown in Graph 1. By 1910 the total number of peach trees was only one-third of the total in 1900. A similar drastic reduction in the number of peach trees occurred during this period in the counties adjacent to Washington County, and in the entire State of Maryland as well.[1] This great decrease was caused by low winter and spring temperatures which occurred in Washington County and the surrounding areas.[2] In contrast to the trend of apple trees the trend of peach trees shows a net decrease from 1910 to 1950, with a sharp drop between 1920 and 1925, which was a result of severe spring frosts in 1921 and 1923. The temperatures did not drop low enough, however, to do serious damage to the apple trees, as was the case during the 1900-10 period when both apple and peach trees were reduced in number. Between 1930 and 1950 the trends of apple trees and peach trees were similar, because of marketing conditions affecting both fruits. There was a drop in fruit prices during the 1930's, followed by a substantial increase during the World War II, and finally another drop during the post war years, while production costs remained high. In the next ten years the trend very likely will continue downward.

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1 In 1900, Maryland; Frederick Co., Md.; Fulton Co., Pa.; Franklin Co., Pa.; and Morgan Co., W.Va. had 4,000,000, 150,000, 38,000, 339,000 and 79,000 peach trees, and in 1910, 1,497,000, 49,000, 9,000, 87,000 and 44,000, respectively (U.S.Census Bureau).

2 For instance, the lowest temperatures were recorded in Hancock in February 1899 (18 F below zero) and in January 1904 (17 F below zero). In Chewsville, the lowest temperatures were recorded in February 1899 (20 F below zero) and in March 1900 (7 F below zero). (U.S. Weather Bureau, Bulletin W).

Trend of peach production has fluctuated as that of apple trees because of similar reasons. The fact that production of peaches decreased steadily from 1910 to 1950 (1900 production is not included, because of crop failure) indicates that yield per tree did not increase sufficiently to offset the general reduction in the number of trees. This is in contrast to the situation with regard to apple production. Such condition can be explained by the fact that, during this period, the apples were mainly produced by commercial growers who were able to expend a great deal of capital and effort to improve quality as well as increase productivity, while peach production remained in the hands of small orchardists.

Graph 2 shows the trends in the other fruits: pears, plums, cherries, and grapes. It is obvious from this Graph that the total number of trees decreased between 1900 and 1950. Grapevines showed a great decrease in 1900-10, then a slight increase in 1910-25, which was followed by another sharp decrease in 1925-30 and a general decline during the last twenty years. Pear and plum trees were subject to a remarkable fluctuation during this period, but cherry trees in general maintained the same level, with some ups and downs in the 1930-45 period. Inasmuch as these fruits are produced by small growers and on small patches of land, the fluctuation and the general decline in the trend become a matter of individual attitude of the growers rather than a matter determined by specific physical or economic factors.

The presentation of the fruits in this Chapter has revealed several facts in regard to the fruit industry of Washington County. Apples and peaches are predominantly important in the orchards of the County, and give the County leadership in the State from standpoints of acreage and production. Each of these major fruits is produced from more than a dozen improved and older varieties. It is also obvious that the leading sectional concentractions of fruit production in the County are in the Hancock and Ringgold-Cavetown areas. There has been a general decline, during the past fifty years, in the number of trees of all fruits, with the exception of apples. Production figures have shown an absolute or relative increase from 1930 on, because of the increase in yields.

The following chapter deals with the physical and economic factors of the fruit industry in Washington County, and the relationship between these factors and the establishment of fruit farming on one hand and the adjustment of human activities according to the prevailing physical conditions on the other.

CHAPTER IX

THE PHYSICAL AND ECONOMIC FACTORS THAT AFFECT THE FRUIT INDUSTRY

The concentration of orchards in certain sections of Washington County would lead one to investigate the physical factors that favor production of fruits rather than of other crops commonly grown in the County. Without favorable physical conditions, fruit growing, as is true for the growing of any other agricultural commodity, would be impractical, if not impossible. Therefore, an analysis of these conditions is the first step toward uncovering the geographic basis of the fruit industry in Washington County in general, and in certain parts of the County in particular. The pattern of geographic distribution, which was presented in Chapter VIII, shows that we may confine the analysis of physical conditions to those found in the Eastern and Western Divisions.

Just as favorable physical factors are desirable to provide a certain degree of basic stability for the industry, so favorable economic factors are a requisite for the successful commercial development of the industry. In other words, favorable economic factors are just as necessary as favorable physical factors, as the fruit industry depends for its economic existance upon the marketability of the products. Both groups of factors will be discussed separately in this chapter.

PHYSICAL FACTORS

The variation in physical conditions within an area is often an important factor leading to areal differentiation in land use. Accordingly, agricultural activities vary from region to region, and even from section to section. On the other hand, similarities in physical factors in given regions may create similarities in land use and ways of life provided differences in culture and technical knowledge of the people, and in economic conditions are not too great.

The farmers of Washington County produced fruits in some localities as early as the eighteenth century. However, because of inadequate transportation facilities and lack of demand, production was limited to covering the needs for local consumption only. No surplus fruit production was reported by the census until the beginning of the present century. The following are the main physical factors that affect the fruit industry in Washington County:

1. Weather and Climate. Apple trees grow throughout the middle latitudes, from areas with cool winters to areas with decidedly cold winters. To the north, they are limited by absolute minimum temperatures falling below about (-27 to -30^{o} F.) and to the south, by the requirement that in order to produce satisfactory fruit, they should have a cold, dormant period of at least several months. They grow mostly in humid regions, but can be produced in subhumid to semi-arid and arid regions provided irrigation water is available. Thus, apple

trees have a fairly wide range as a crop. If certain apple varieties have become adapted to a region, they become susceptible to any sharp deviations from the general weather and climatic characteristics of that region, and will not thrive well under different climatic conditions.

So peach trees can be grown within a fairly wide range of climatic conditions, but they are more susceptible than apple trees to extreme weather conditions. Both the blossoms and fruit are usually sensitive to extreme weather conditions, which makes peaches a rather hazardous crop.

The weather and climatic conditions are discussed here to show the characteristics of a major physical factor favorable to fruit production in Washington County in general, and in each of the fruit-producing districts in particular.

The mean summer temperatures in Washington County range from 70 to 75° F., and mean maximum temperatures lie between 80 to 85° F. Extreme highs of 103 to 109° F., were recorded in August of the years 1936 and 1918 in Hancock and Keedysville. But in this County and the rest of the Appalachian region as well, summer heat is not important because peach and apple trees can stand comparatively high temperatures without injury, if the duration of the hot period is brief and there is enough moisture in the soils. During the summer months precipitation is heavier than during the other months of the year (see Chapter IV, Plate 3). According to available records average monthly precipitation is higher in the Eastern Division than

in the Western Division, 3.5 inches in Hancock, Western Division, and 4.0 in Edgemont, Eastern Division. However, this difference is too small to have a significant effect on the growth of the fruit trees.

In winter, the mean monthly temperatures range from 30 to 33° F. in the Western Division, and from 31 to 34° F. in the Eastern Division. Mean minimum temperatures are 19 to 23° F. in Hancock and 23 to 25 in Keedysville. With such mean minimum temperatures, the absolute lows never fall to levels which might cause permanent damage to dormant trees. A low temperature of -5° F. has been considered safe and not likely to cause injury to the fruit trees if it does not last too long, although it may injure the roots if it occurs as a sudden drop after a long, dry, and comparatively warm period. Unusually low temperatures in winter below -10° F. when they occur during a long, dry period may cause injuries to the trees. Average precipitation in the winter months is around 2.4 inches in Hancock and 2.7 inches in Edgemont.[1] Lowest precipitation has always been lower in Hancock than in Edgement.[2] Because the trees are dormant during the winter, this amount of precipi-

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[1] Edgemont's record of precipitation is used here for the Eastern Division, but because temperature data are not available for this station, those for Keedysville are used. Although Keedysville is located within the Division, the record of Edgemont would be preferred, because it is located right in the center of the Ringgold-Cavetown fruit area.

[2] Lowest precipitation in Hancock was in December 0.6, in January 0.98, and in February 0.27 inches. In Edgemont the lowest precipitation in these months was; 0.8, 1.21, and 0.3, respectively.

tation is sufficient. A long dry period in winter followed by a dry spring may cause injury to the trees. However, such conditions are infrequent in Washington County, particularly in the Eastern Division. After an unusually dry winter, the orchards in the Western Division would benefit by irrigation in spring, but in the Eastern Division such would not be the case, as lowest monthly precipitation is somewhat higher, and because of differences in water-retaining capacity of the soils. These differences will be further discussed later.

Apple and peach trees do not thrive where winters are severe, but they definitely need winter chilling. If winter passes with unusually long warm spells and not enough chilling, the growth of new shoots and blossoms will be below normal the following spring. Washington County and the rest of the Appalachian Belt have cool winters and this condition makes it possible to grow a wide range of varieties. Some apple and peach varieties are more resistant to low winter temperature than others (see fruit varieties and their characteristics in Chapter VIII).

Fruit trees are very susceptible to low temperatures and drouths in fall and spring, but spring is the vitally important season in which, to a large extent, the quality and quantity of the crops are determined. Mean monthly temperatures in spring (see Appendix B) range from 41 to 43° F. in the various divisions of the County. But the mean monthly minimum is

lower in the Western Division than in the Eastern Division.[1] The lowest temperatures in the spring months are also lower in Western Division.[2] Average precipitation during the spring months, as well as during the fall months ranges between 2.2 and 4.6 inches, and in every month it is higher in the Eastern Division than in the Western Division.[3]

In spring both precipitation and temperature are important for the growth of the blossoms and early stages of fruit development. If the season is relatively dry, the quantity and quality of the fruit will be lower, and the harvesting period will be delayed. Spring drought can seriously affect the development of fruit, particularly if it is of long duration or occurs after an unusually dry winter. In general, however, the quantity of spring precipitation is sufficient for normal growth of the trees and for development of the fruit.

Low temperatures in late March and early April, below 32° F., are considered dangerous, because the fruit buds are extremely tender. If temperatures drop to 20° F., there is considerable possibility of losing the entire peach crop and much of the

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1 In Hancock, mean monthly temperatures in March, April, and May are respectively: 30, 38, and 48°F., in Keedysville: 32, 40, and 50. Similar differences are found in the fall months, September, October, and November.

2 In Hancock, 4, 7, and 21°F., and in Keedysville are 0, 10, and 27° F. Similar differences are found in September, October, and November.

3 In Hancock, the average monthly precipitation for March, April, May, September, October, and November: 3.1, 3.1, 3.7, 2.9, 3.2, and 2.3 inches and in Edgemont 3.2, 3.4, 4.7, 3.2, 3.8 and 3.3.

apple crop. The critical temperature in this season is about 27°F. Later, during late April and early May, the danger is less acute because there is less likelihood that temperatures will drop below the critical point, and the buds have become sufficiently mature to withstand moderate weather changes. Over a period of years, abnormally low spring temperatures occur more often in the Western Division than in the Eastern Division, particularly since in the Hancock area the period of time when a killing-frost may occur is longer than in the Ringgold-Cavetown area.

For the County as a whole, the period of killing-frost is almost seven months. Bulletin W shows that the first killing-frost usually occurs in late September or early October. However, a killing-frost was recorded as early as September 11, 1924. The last killing-frost usually occurs in May, although one was recorded as late as June 1, 1930. On the average, however, killing-frosts may occur any time from the middle of October to the middle of May (see Chapter IV for further analysis). The occurrence of the spring frosts is so vital that it must be considered the chief limiting factor in the fruit industry of Washington County. Because such frosts usually occur shortly before, during, or after bloom, they constitute a tremendous hazard.

Even more important than the general weather and climatic conditions that prevail in the two fruit-producing divisions of the County, are the micro-climatic conditions of different sites. The proper selection of orchard sites is important to

the growth of the trees and the development of the fruit. Consequently growers should investigate the micro-climatic conditions of sites for their orchards more carefully even than the general climatic conditions of the area.

The distribution of orchards in both divisions, Eastern and Western, shows the limitations imposed by micro-climates. The micro-climates are developed more as a result of local variations in elevation, exposure and slope, than of soil or vegetative cover. On cold, clear, quiet nights, when most spring frosts occur, the temperature in a valley or a depression enclosed on all sides by hills may be a few degrees lower than in more elevated spots. Differences in temperature between a valley bottom and a belt of land not more than 100 feet higher might be from 5 to 10^{o} F.; a difference, in spring particularly, between complete crop failure in the valley and a full crop in the higher orchards.

The hazard of extreme winter cold and of damaging spring frost can be reduced by selecting the most favorable sites for orchards, although it cannot be entirely eliminated. All of the orchards of a region may suffer from a sudden severe drop in temperature. This situation is not frequent in Washington County, and the last instance occurred in 1945, when the Hancock area suffered a complete crop failure. This type of frost condition is unusual and, therefore, need not be taken into consideration in a given plan for orchard planting.

Spring frosts and winter freezes are more frequent in the Western Division, where some orchards suffer from spring frost

almost every year, thus, operation of these orchards is rather risky. The development of new apple and peach varieties helps growers to plant suitable varieties at various elevations within a given orchard or a complex of orchards. At lower elevations it is desirable to plant varieties with greater frost resistance. New varieties which produce fruit of high quality often are somewhat less resistant to frost, and, therefore, should be planted at higher elevations. Also at higher elevations days may be somewhat cooler which favors high quality fruits.

In a valley or depression surrounded on all sides by higher land, low temperatures are created by air drainage. The cold air flows from the higher land to settle in the low spots. Thus, a cold air pool will form at night over such low areas. If such cold air stagnates over a low orchard, a drop of several degrees in temperature may result, which may cause complete or partial crop failure, particularly if the trees are in bloom or in bud. If the lower side of an orchard is bordered by timber, frost pockets will be formed in the orchard, as cold air accumulates in pockets on the lower slope, because air movement is slowed down by the woods. Hazard of cold air pools and frost pockets can be avoided by providing for air drainage, when selecting a site for an orchard, or by artificial means such as using oil burners or operating an airplane engine which is usually placed in the lower part of the orchard, to keep the air constantly blowing upward, thus, such air movement would prevent the formation of cold air pool in the orchard.

2. Land Forms. In Washington County, as in many parts of the Appalachian Belt, orchards are located on the lower slopes of the ranges. The Appalachian Mountains give to this fruit belt considerable protection from extremely low temperatures during winter and spring, a protection that is of great significance to the development of the fruit industry in this area. How favorable land forms are to orcharding does not depend so much on elevations as it does on local relief. This, in turn, is mainly related to frost hazard and frequency. In Washington County, orchards are located at sufficiently high elevations so that the growing season is comparatively cool.

The Eastern Division, which occupies the western slopes of South Mountain and includes Elk Ridge, is well-suited for orchards, because most of the slopes and foothills here are open and provide excellent air drainage. The gentle slopes of this Division are of advantage in the use of mechanical spraying and cultivating equipment. Pruning, thinning, harvesting, and hauling can be achieved without much difficulty. In this respect the Eastern Division has more favorable conditions than the Western Division. In the southern part of the Division the main slopes generally are too steep for orchards, and have been left in forest. The orchards occur on lower hilltops and on some of the higher fields. In general, all fields having moderately high elevations in this Division are favorable for orchards. Such fields occupy almost one-fourth to one-third of the total acreage in Ringgold and Cavetown Districts, and much smaller portions in the other districts such as Boonsboro,

Photo 11. A commercial Raspberry field in the Ringgold-Cavetown area. (Courtesy of Hagerstown Chamber of Commerce).

Photo 12. An orchard located north of Hancock, planted on a steep slope.

Keedysville, Rohrersville, and Sandy Hook.

Peaches are predominant in the Eastern Division, particularly in Cavetown and Ringgold Districts, where there are excellent sites for peach orchards. The great concentration of peach trees in these districts indicates that peaches grow well here, but not that they grow better than apples.

The Western Division includes deep, narrow valleys, and high ridges with steep slopes. A comparatively small portion of this Division is used for orchards, pastures, and grain production, and most of it is in forest. Fruit is the principal crop in the Western Division, particularly in the Hancock District. The concentration of apple and peach trees in three sections of this District (see Plates 7 and 8), reflects the favorableness of the physical factors for orcharding. Elevations that are too high, slopes that are too steep, and soils that are too shallow make the rest of the Division unfavorable for orchards. Actually only a small portion of the total area can be classified as favorable for fruit growing.[1] Usually the high ridges, such as Sideling Hill and Tonoloway Ridge, are mostly forested, because of steep slopes and very shallow soils, and the deep valleys are used for grain production and pasture. In many cases, forest extends down to the bottom of the valleys, leaving no land which is used for agricultural purpose. Moderately high ridges and hills and moderately deep valleys are

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[1] The total area of the Hancock District is 34,176 acres and the fruit acreage was 5,100 in 1945.

the only morphological features suitable for fruit and general farming, although most have poor soils, and many localities have poor air drainage. Thus orchards in the Western Division suffer more from spring frosts and winter freezes than those of the Eastern Division. Such ridges and hills are usually planted with fruit trees from the bottom almost to the top. The very top of the ridges are considered unfavorable sites for orchards, because of exposure to heavy winds which are detrimental as they may: (i) injure the trees; (ii) interfere with spraying; (iii) intensify the hazard of winter cold; and (iv) cause trees to bend permanently, particularly if the tree is young.

Large-scale production of apples in the Western Division does not mean that the area is ideally suited to apples, but rather that apples grow better here than peaches.

3. Soils. A third physical factor to be considered for successful fruit growing is soil. In general, apples and peaches grow on many types of soils, ranging from coarse shales to fine-textured clay loams, but there are four characteristics which are vital to tree development and fruit production:[1] (i) good drainage and aeration; (ii) good water-holding capacity; (iii) capacity to absorb water readily; and (iv) fertility.

In Washington County a great many types of soils occur in the two fruit-producing divisions. These soils range from fertile and medium-textured Hagerstown silt loam to infertile

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1. J.R. Magness, "Establishing and Managing Young Apple Orchards", U.S. Department of Agriculture, Farmers' Bulletin No. 1897, Government Printing Office, Washington, D.C.: May 1942. p. 4

and coarse Ashly shale loam (see Plate 2).

Principal soils in the Eastern Division are: Murrill and Dekalb Series which include soils such as Elk silt loam, Murrill gravelly loam, Murrill gravelly sandy loam, and Dekalb silt loam. These soils are mostly deep, well-drained, have high to moderate moisture capacity and inherent fertility, and are well suited for fruit trees. For instance, soils which are derived from limestone parent material usually need less fertilizer per acre. Sufficiently deep soils, 2-3 feet, reduce the danger of soil erosion, if the slope is rather gentle; with a deep subsoil, 3-6 feet, they can hold and store sufficient moisture to maintain the growth of trees in case of drought. In medium-textured soils there is little danger of water-logging, which might kill the roots during active growth.

In the Western Division there is a great variety of soils, mainly from the Berks, Porters, Ashe, and Upshur Series, such as Ashly shale loam, Berks shale loam, and Landisburg cherty silt loam. They range from moderately deep to shallow and from poor to very poor, and are medium-textured, with low-moisture-holding capacity. The shallowness of the soils and subsoils which together are not over two feet deep on some of the steeper slopes in the Western Division is unfavorable for orchards because: (i) it increases the amount of fertilizer needed per acre to maintain a satisfactory ground cover; (ii) it increases the danger of soil erosion; (iii) the shallow soils cannot retain enough rainfall to insure good growth of trees and development of fruit during times of drouth; and

(iv) the roots of trees cannot penetrate deep enough into the ground to avoid low ground surface temperatures. In regard to the disadvantages of planting fruit trees on shallow and poor soils, Magness says:[1]

> Establishing and maintaining an orchard to bearing age is very expensive, costing in most parts of the United States from $100 to $200 per acre. Many orchards have been planted on soils so shallow and so poor that an intelligent examination of the soil would have shown at the start that there was no chance for the orchard to prove successful. The old idea that soil unfit for other use is satisfactory for an orchard has been costly to many growers.

Growers in this area help retain soil moisture and prevent soil erosion by maintaining a heavy ground cover (green, sod, or crop cover). They also supplement the low inherent fertility of the orchard soils by use of extra quantities of chemical fertilizers.

In contrast, the general physical characteristics of the soils in the Eastern Division are more favorable for growing fruit and other crops, as well.

It is significant to note here, that the Potomac River forms the southern limit of the fruit-producing areas of Washington County, because immediately beyond the River in Virginia and West Virginia, the land forms and soils are not favorable for growing fruits or other crops.

The fact that the orchards terminate abruptly at the Pennsylvania Boundary line would indicate that there is some

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[1] Ibid. p. 4

historical reason probably closely related to land ownership during and after the Civil War.

ECONOMIC FACTORS

Fruit, chiefly apples, has become the most important crop of the Western Division of Washington County, despite some physical disadvantages. Favorable economic factors have contributed much to the development of the fruit industry in this Division, as well as in the entire County.

1. Low Cost of Land. Due to unfavorable physical characteristics for general farming of the foothills and slopes in the Eastern and Western Divisions, cost of land in these divisions is relatively low as compared to land in the Central Division (Hagerstown Valley).[1] In Washington County the value of agricultural land bears a direct relationship to the location and distribution of orchards, as well as to their establishment and expansion in certain sections.

In general more capital and labor will be used in farming the more valuable agricultural land, in order to realize greatest returns through higher production. In the Central Division of Washington County the land has long been given more thorough tillage and fertilization so as to secure highest possible production from each acre, whereas land in the foothills and slopes of the Eastern and Western Divisions generally

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[1] Farm land in Central Division cost $400 per acre or more, while in the other divisions the cost per acre ranges from $150 to $200.

was used extensively, with comparatively small expenditure of capital and labor per unit of land. Thus, land in the foothills and on the slopes was considerably cheaper than in the valley, which made it profitable to use the favorable sites for orchards, grains, or pastures, while the remainder of the area was left chiefly in forests or wooded-pastures.

Fruit production in the Western Division is entirely on a commercial scale. Low cost of land attracted growers who established large orchards, and it was large-scale production that made the fruit industry important in Washington County, because improving quality and yield require larger investments than the small farmers and orchardists can afford. Apple and peach trees must be planted about thirty feet apart, and since the ground between must be seeded and fertilized in order to maintain a good green cover for protection of the trees, other crops for cash or home use cannot be interplanted. Consequently, it is uneconomical to plant apple or peach trees on high cost land, and small farms. If the orchards in the Western Division had been owned and operated by small growers, production of fruit, particularly apples, in Washington County would be much smaller than it is today.

2. Location in Relation to Major Markets. The fruit-producing areas of Washington County are located within comparatively short distances from several large consuming centers such as the Washington, Baltimore, Pittsburgh, Philadelphia, and New York Metropolitan areas. Nearness of a producing area to a market is of great significance, because it gives the

producers an advantage in competing with more distant producers.

The eastern part of the United States, with its great industrial cities, is the largest market for apples produced in the main apple-producing areas of the country: the Northeastern, Central Atlantic, and Western Sections. In recent years apple production of these three sections has averaged about eighty-four per cent of the apple crop of the United States.[1] Washington County is a part of the Appalachian Belt which is included in the Central Section. Thus, the County apples compete with the apples from other parts of the Appalachian Belt on one hand, and with the apples of the other sections, particularly the Northwestern Section, on the other. Competition between the producers of the Appalachian Belt is compensated, however, by many cooperative activities such as, fighting diseases and insects and exchanging information about experimental results during the inter-state-conferences of the horticulturists and entomologists. Besides, from the

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[1] According to Magness, Apple Varieties and Important Producing Sections of the United States, the three major apple-producing sections are:

(i) Northwestern Section includes, New England states and parts of Ill., Ind., N.J., N.Y., and Ohio States; 25 per cent.

(ii) Central Section includes the States of Del., Md., N.C., S.C., Va., and parts of Pa., N.J., W.Va., and Ga.; 25 per cent.

(iii) Western Section includes all the area located west of the Rocky Mountains; 34 per cent.

standpoint of the United States apple production, the Appalachian Belt may be considered as a single producing unit, and the competition in the large terminal markets is primarily between the Appalachian Belt and the Northwestern area (States of Washington and Oregon).

The Northwestern apples are superior to the Appalachian apples in skin color and size. Apple production of Washington and Oregon has increased greatly during the past two decades, and it is likely to maintain an upward trend in the near future. Production per bearing tree in the Northwestern States averages three times that of the Appalachian Belt.[1] The increasing total production, yield and quality of apples from the Northwestern states give that area three advantages against the one advantage of nearness to major markets, which favors the Appalachian Belt. For instance, the transportation cost in 1948 amounted to one dollar and twenty-five cents per bushel of apples shipped from the Northwestern states to Pittsburgh, while it was only fifteen cents per bushel for the Appalachian Belt. The fruit industry of Washington County and the rest of the Appalachian Belt has been able to meet the competition because of this economic factor of nearness to major terminal markets.

3. Know-How. At the present time, "know-how" is an important economic factor for establishing or developing any industry.

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[1] J.R.Magness, "Apple Varieties and Important Producing Sections of the United States", U.S. Department of Agriculture, Farmers' Bulletin No. 1883, Government Printing Office, Washington, D.C.: 1941. p.14.

In regard to the fruit industry of Washington County, the results of "know-how" were important in developing the commercial orchards in the Western Division, as well as in increasing production per tree and improving quality.[1] Until 1910 the orchards in the Western Division, which now includes over fifty per cent of total fruit trees of the County, consisted of a few small ones scattered mainly along Tonoloway Ridge. Shortly after that, new fruit growers moved into the County and started the commercial orchards in the Hancock area.[2] They continued to expand their holdings east and west of Hancock until now they own and operate most of the orchards of the Western Division. The growers have been working since to improve quality and yield, because they realize that competition with the Northwestern growers can be met. Five apple growers in the Hancock area and a dozen peach growers in the Ringgold-Cavetown area were responsible for almost two-thirds of the total fruit production of the County in 1950. These growers cooperate with the University of Maryland Experimental Station at Hancock and try to improve all phases of fruit growing such as planting new varieties, selecting more favorable sites for orchards, controlling diseases and insets, maintaining better green-cover, etc. The results of their

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[1] Production per bearing tree was 1.7 in 1900, 2.4 in 1925, and 4.0 bushels in 1950.

[2] For instance Mr. Stanley Fulton came from Michigan to this County around 1920 and established the first blocks of his orchards which now cover 800 acres.

experiments are advantageous to all growers and to the fruit industry of Washington County and of the Appalachian Belt, as well.

ORCHARD MANAGEMENT

In both the Eastern and Western Divisions of Washington County, growers keep their orchards relatively young by replanting the old orchards or by planting new acreages, although this practice has been limited during the past five years.

Young apple and peach trees whether reproduced in the orchard or bought from the nurseryman, may be planted in Washington County whenever the ground is unfrozen during late fall, winter, or early spring. The transplanting period is long, because in this County the temperature seldom drops much below the freezing point, even in winter.

Most of the orchards in Washington County are planted on a square or rectangular system, because the land and soil conditions are satisfactory for maintenance of a good green cover, and tillage and other cultural work can be done easily along and across the rows. In the Western Division, however, in particular where the steepness of the slope is more than 30 per cent, contour and terrace planting is commonly practiced, in order to conserve soil and water. In a contour-planted orchard trees are usually evenly spaced and set in a row along a contour line, in such a manner that rows are closer together on steep, and farther apart on more gradual slopes. Terraced orchards are found only on sites which are subject

Photo 13. Young orchard in the Hancock area. Note the woodland on the crest of the hill.

Photo 14. An old orchard on the upper slope of the ridge. The lower slope is in young trees. Note the thick cover-crop in the foreground.

to water flow. Although contour and terrace systems of planting are quite important for orchards in most of the Western Division, the practice has not been followed extensively because of the resulting difficulties in using heavy equipment for cultivation, spraying, hauling, etc., in this type of orchard.

Fertilization and Spraying. Fertilizer is used to build up the fertility of the soil and maintain a satisfactory cover crop. Most of the growers in Washington County use 4-16-4. In the Hancock area, where soils are shallow and poor, an average of 400 to 500 pounds per acre is applied, while in the Ringgold-Cavetown area, an average of 200 pounds per acre is sufficient. This type of fertilizer is used to stimulate growth in order to bring young trees to bearing age as quickly as possible, and to build up organic matter in the soil by improving the cover crop. Cover crops are usually seeded in midsummer or late summer, and left to grow until late spring when they are disked into the soil. Rye, which is particularly good as a winter cover, barley, alfalfa, clover, soybeans, or a mixture of grains may be used. Seeding of a cover crop is needed once every five years. Cover crops in the orchards serve other purposes in addition to maintaining high content of organic matter. They are useful in: (i) preventing excessive evaporation; (ii) retarding soil erosion, particularly on the steep slopes of orchards in the Western Division; and (iii) preventing excessive growth of peach and pear trees, since large trees are undesirable.

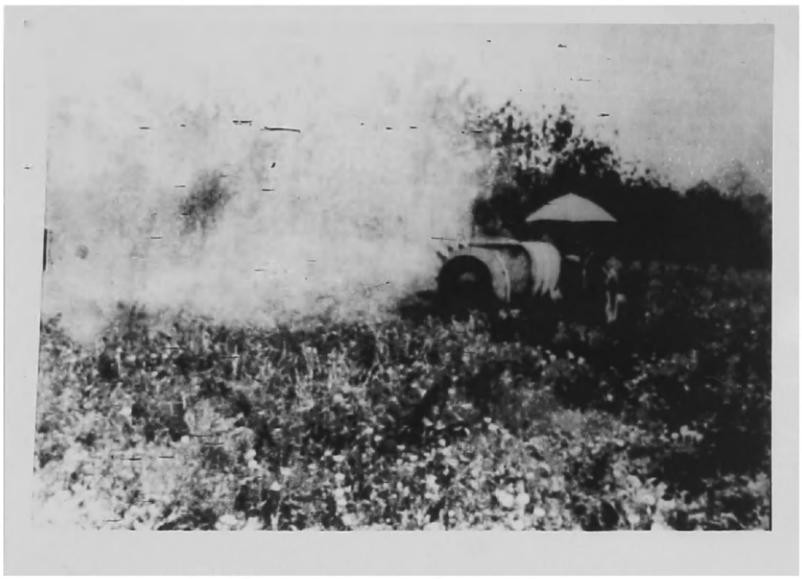

Photo 15. Spraying in the Ringgold-Cavetown area.

Photo 16. Spraying in the Hancock area.

Photo 17. A large barn used to house the equipment and as pumping station. A small pond is shown between the barn and the farm-house, used to store water-supply for spraying.

Potash is not necessary for the orchards of Washington County, because heavily leached soils do not occur. Nitrate of soda or sulfare of ammonia are used to promote tree growth.

The quantity of fertilizer used, is increased with the age of the trees. It is usually spread about three feet from the trunk, in average amounts of 1.25 pounds per tree in the Western Division and 0.75 to 1.0 pound in the Eastern Division. According to Magness, ".....about one-third pound per tree for each year of age of the tree usually giving satisfactory results."[1] This means that because of soil conditions growers of Washington County need to use more fertilizer per tree than what is considered generally satisfactory.

Spraying is a major task and must be done according to a rigid schedule.

Two different methods of spraying are used by fruit growers in Washington County: (1) Mechanically operated spray machines are used in the Eastern Division, where the land permits use of heavy equipment. (2) In the Western Division, however, steep slopes limit the use of heavy machinery. Thus here, the mixture of spray-material and water is pumped from a central pumping station to the various orchards which are connected to the station by pipes equipped with valves to which hoses can be attached. By using a hose, the farmer can spray sixteen trees from each valve.

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1 J.R. Magness, "Establishing and Managing Young Apple Orchard", U.S. Department of Agriculture, Farmers' Bulletin No. 1897, Government Printing Office, Washington, D.C.: 1942. p. 16.

CHAPTER X

FRUIT MARKETING

From the time the fruit is harvested until it reaches the consumer, many operations are required such as cleaning, grading, sizing, packing, shipping, and marketing. These services take almost four-fifths of every dollar spent by the consumer for fresh apples or peaches. Thus, the grower's return is determined not only by the quality of his produce, but a large extent by marketing expenses. The future of the fruit industry of the entire Appalachian Belt depends primarily upon cost of marketing and the development of efficient methods of marketing rather than upon the physical conditions in the belt.[1]

PREPARING FRUIT FOR MARKET

A sufficient and dependable labor supply is an important factor in proper harvesting and preparing apple and peach crops for market. An adequate labor supply usually can be obtained from the neighborhood families in the Eastern Division of the County and from the town of Hancock or other nearby towns in the Western Division.

Hauling fruit from orchards to packing-house (packing-shed) or to market begins with the start of the harvest season. During the 1949-50 season, this operation cost the Appalachian

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[1] Publications prepared by the Bureau of Agricultural Economics, U.S. Department of Agriculture and others for the Appalachian fruits are the major source for this presentation. Specific conditions which have a bearing upon the marketing of fruit of Washington County will be pointed out.

grower an average of five to fifteen cents per packed bushel.[1]

As soon as the fruit reaches the packing-house, it is washed, graded, sized, and packed. Part of the crop is then sold and shipped by truck or train to the buyers, and the rest is placed in cold-storage. There are large packing-houses in Washington County located near Hancock on the main highway (U.S. 41), and smaller ones around Smithsburg, so that packing-houses are within a short distance (5 to 10 miles) from the orchards.

Most of the apples produced in Washington County are graded and packed with packing-house equipment owned and operated by the growers. A relatively small percentage is handled by centralized packing plants operated either as cooperatives or by individual owners. These plants are located near the market rather than in the producing area. The grower-operated packing-houses and facilities may be used at full capacity during two to three months of the harvest season, and usually remain nearly idle during the remainder of the year. Thus, a considerable amount of the grower's capital, which may range from a few thousand to several hundred thousand dollars, is invested in equipment that is likely to be unproductive during most of the year. Unless a grower can use this equipment for packing a larger number of units for himself or other growers, he must absorb such charges as depreciation and maintenance

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[1] H.H. Reizenstein and H.W. Bitting,"Farm-to-Retail Margins For Appalachian Apples Marketed in Pittsburgh 1949-50 Season", U.S. Department of Agriculture, Agricultural Information Bulletin No. 44, Government Printing Office, Washington, D.C.: 1951. P.7.

during a relatively short time. The average charge for packing-house services in the 1949-50 season was twenty per cent of the Pittsburgh consumer's dollar spent for Appalachian apples.[1]

Many types of containers are used in Washington County for packing fresh apples and peaches. The bushel basket, or "tub", is the type most widely used for apples and peaches in all parts of Maryland,[2] because it costs a few cents less than the box. In recent years the Northwestern bushel box has become increasingly popular for packing U.S. Fancy Appalachian apples.[3] The practice of delivering fruit to nearby towns and chain stores in field boxes has been tried in recent years, in order to reduce marketing costs, but it has not become popular because some of the savings are offset by loss and breakage. Packing apples in 5-pound mesh bags has helped to increase the volume of sales in retail stores. "In 1948, 15 per cent of the apple crop in Washington County was sold in mesh bags--approximately 75,000 pounds."[4]

The average cost of a covered basket or a Northwestern box

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1 Ibid., p. 8.

2 "In 1948, 73 per cent of all apples and 80 per cent of all peaches were marketed in bushel baskets" C.W. Porter and A.R. Miller, op. cit., p. 30.

3 H.H. Reizenstein and H.W. Bitting, op. cit., p. 9.

4 C.W. Porter and A.R. Miller, loc. cit.

Photo. 18 An apple tree in the harvest season in the Ringgold-Cavetown area, with the heavy crop of 1952.

Photo. 19 Field boxes filled with apples for hauling to the packing-house. Note the drop-bottom picking bag hung around the farmer's neck. (Courtesy of Hagerstown Chamber of Commerce).

amounted to ten per cent of every dollar spent by the consumer for Appalachian apples.[1] The problem of container costs is of great concern to the growers.

> The problem of container costs, which have increased in recent years has been of increasing concern to all who are engaged in the marketing of packed apples, especially growers.....Savings could be realized by grower, retailer, and consumer, if these costs were reduced.
>
> Some growers, faced with the necessity of lowering the packing cost have experimented with used containers, chiefly baskets...../2/

COLD STORAGE

Cold-storage facilities are used to keep fruit for a longer period of time, either at the shipping point or in the terminal market, in order to control its distribution. Cold-storage services include receiving, moving and stacking the fruit, controlling temperatures, etc. In the Appalachian area there are two types of cold-storage facilities: commercial and private. More than ninety per cent of the Appalachian apples were held in commercial storage warehouses in the 1949-50 season, and the rest was held in private storage facilities.[3]

> Commercial cold storage facilities, include some of the largest in the United States, are maintained at chief shipping points in the Appalachian area. Some of the principal facilities are located at Winchester, Martinsburg, Hagerstown, Chambersburg, Staunton and Charlottesville shipping points./4/

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1 H.H. Reizenstein and H.W. Bitting, loc. cit.

2 Ibid., p. 19

3 Ibid., p. 10

4 Ibid., p. 10

In Washington County, storage facilities owned by growers were constructed near Hancock to store apples from the Western Division, where more than half of the apples of the County are produced. Growers of the Eastern Division have no such facilities, and their produce is shipped mainly to the terminal markets to be stored in commercial storage warehouses. About one-third of the apple crop every year requires cold-storage; the other two-thirds move directly to the processing plants or the market. The peach crop of the County usually moves directly from the orchards to the purchasers through various marketing channels. Thus it is not necessary for peaches to be kept in cold-storage for any substantial length of time.

Private cold-storage facilities are less expensive than the rates charged by commercial operators. Besides, private cold-storage has several other advantages: (i) better control over fruit at the time of harvest; (ii) higher efficiency in packing; and (iii) greater control over marketing of the fruit.

Cold-storage expenses for the Appalachian packed apples during the 1949-50 season averaged twenty cents per bushel, which is equivalent to five per cent of the consumer's dollar spent for these apples.[1] Expenses vary, however, according to the duration of storage and extra services which might be required before marketing, such as recleaning, regrading, rewrapping, etc.

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[1] Ibid., p. 9.

TRANSPORTATION OF FRUIT TO MARKET

In general, the distance from all shipping-points of the Appalachian area to the major metropolitan centers such as Pittsburgh, New York, Philadelphia, Baltimore, Washington, D.C., and Atlanta is not greater than 300 to 500 miles. Fruit is shipped to these centers chiefly by trucks. Highway transportation offers some advantages over railroads to both the grower and buyer of fruits. It is less expensive and is more flexible in selection of route and in loading and unloading. Growers of Washington County use railroads only for shipping apples to distant markets such as Pittsburgh, Philadelphia and Atlanta. However, rail shipments of apples are significant in Washington County, as about one-third of the total apple crop is transported this way.[1] Rail shipments of peaches from the County are very small; those not sold locally are shipped by truck to the metropolitan areas.

This advantage of proximity to the principal terminal markets, enjoyed by Washington County fruit growers, is of great significance, since the low shipping costs help make it possible to compete with apples shipped from Northwestern United States. Transportation costs per bushel from Hancock to Pittsburgh, Philadelphia, Washington, D.C., and Atlanta in the 1949-50 season were 15, 20, 12, and 25 cents, respectively.

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[1] According to Porter and Miller, p. 29, rail shipments of apples initiated in Maryland were 20 per cent of the total production; in Washington and Alleghany Counties they were larger than in the other counties, particularly in the former where these shipments averaged 30-40 per cent of total production.

This is equivalent to five per cent of the consumer's dollar spent for Appalachian apples.[1]

MARKETING OF FRUIT

The location of a fruit-producing area in relation to large urban centers and major highways determines to a great extent the marketing channels of the fruit. Fruit-producing areas located close to large cities, sell a higher percentage of their produce locally (at the farm), because traffic over the principal highways bring customers into the area where they purchase the fruit at roadside-stands. This is a more profitable method of marketing produce since there are no packing, cold-storage, transportation and similar expenses.

Conversely, areas which are more distant from large cities must sell most of their produce in terminal markets. Washington County must be considered as such an area. Table 19 shows that almost ninety per cent of the County apples were sold to terminal markets in 1948*, while in Baltimore County only twenty-four per cent were so sold. In this respect, Allegany County is similar to Washington County, and Montgomery County is similar to Baltimore County. Table 20 shows that over seventy-five per cent of the Washington County peaches were sold to terminal markets in 1948 and less than two per cent of the Montogomery County peaches were so sold.

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[1] H.H. Reizenstein and H.W. Bitting, op.cit., p. 15.

* More recent data is not available.

TABLE 19. Methods of Marketing the 1948 Apple Crop in Main Fruit-Producing Counties, in Maryland.

County	Per cent sold at farm: Roadside stand	Itinerant truckers	Other	Per cent sold off farm: Nearby retail	Processors	Wholesale Commission
Washington	5.5	5.1	0.7	1.4	28.8	58.5
Allegany	0.3	4.5	1.2	4.9	46.3	42.8
Baltimore	26.1	2.0	47.9	17.7	-	6.3
Carroll	47.5	-	34.4	1.5	0.4	16.2
Cecil	0.6	-	14.8	5.5	59.1	20.0
Eastern Shore	7.5	0.7	19.4	13.2	38.5	20.7
Frederick	23.6	1.0	9.8	8.6	21.6	35.4
Harford	4.1	7.1	9.6	5.3	3.6	70.3
Howard	3.1	-	25.7	-	2.6	68.6
Montgomery	79.3	-	1.5	1.3	-	17.9
Southern Maryland	1.2	-	11.3	21.3	-	66.2
State	8.9	4.1	4.5	3.5	29.3	49.7

Source: C.W. Porter and A.R. Miller.

TABLE 20. Methods of Marketing the 1948 Peach Crop in the Main Fruit-Producing Counties, in Maryland.

County	Per cent sold at farm			Per cent sold off farm		
	Roadside stand	Itinerant truckers	Other	Nearby retail	Processors	Wholesale Commission
Washington	9.8	10.7	3.1	1.2	4.8	70.4
Allegany	1.6	45.3	9.8	9.4	-	33.9
Baltimore	25.2	-	38.6	8.2	-	28.0
Carroll	50.0	-	23.8	3.5	3.8	18.9
Cecil	-	-	87.4	10.2	2.4	-
Eastern Shore	5.2	4.5	20.6	11.6	-	58.1
Frederick	14.1	17.6	46.7	6.2	-	15.4
Harford	34.4	-	21.9	43.7	-	-
Howard	22.5	-	50.1	4.9	0.4	22.1
Montgomery	85.6	4.6	7.9	1.9	-	-
Southern Maryland	81.8	-	2.1	-	-	16.1
State	14.7	9.7	13.7	4.8	2.9	54.2

Source: C.W. Porter and A.R. Miller.

In 1948, more than two-thirds of the Washington County apples sold off the farms were marketed by wholesalers, and a very small portion was sold in nearby towns such as Hagerstown, Williamsport, and Waynesboro. The rest were sold to processors for canning (Table 19). In the same year, more than nine-tenths of the Washington County peaches sold off the farms were disposed of through the same marketing channels, while the nearby towns absorbed a very small portion of the crop. Only a small portion of the peaches was used for processing purposes.

The wholesale margin of the Appalachian apples for the 1949-50 season was nine cents of the consumer's retail dollar.[1] During the same season, the retailers got thirty-four cents of every consumer's dollar spent for this fruit.[2]

The stability and prosperity of the fruit industry of Washington County depend greatly upon the grower's return which is affected by the efficiency of the orchard management and the cost of fruit marketing. Growers try to reduce cost of production and marketing expenses of the fruit, in order to offset the lower market price on one hand and to maintain satisfactory returns on the other. At present, the marketing charges absorb three-fourths of the consumer's dollar spent for the fruit, leaving one-fourth to cover the cost of production and net profit to the growers.

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[1] Ibid., p. 17.

[2] Ibid., p. 19.

CHAPTER XI

FUTURE OF THE FRUIT INDUSTRY IN WASHINGTON COUNTY

The leading fruits of Washington County, apples and peaches, showed an increase in number of trees from 1940 to 1945 (Graph 1). This expansion was a result of high demand for fruit and high market prices during World War II. During this period, cost of production increased as well, but at a slower rate. From 1946 to 1952, however, the market price of fruit decreased steadily, with cost of production maintaining approximately to war-time level. Accordingly, the grower's return dropped to such an extent that marginal growers were operating at a loss. In addition, frosts which occurred almost every year during this period, magnified unfavorable economic conditions to such an extent that the number of fruit trees decreased by fifteen per cent. In the Hancock area, where the effects of frosts were particularly severe, the reduction in fruit trees, peach trees in particular, was considerable. Not only old trees and trees of inferior varieties, but all trees considered unprofitable for one reason or another, were eliminated.

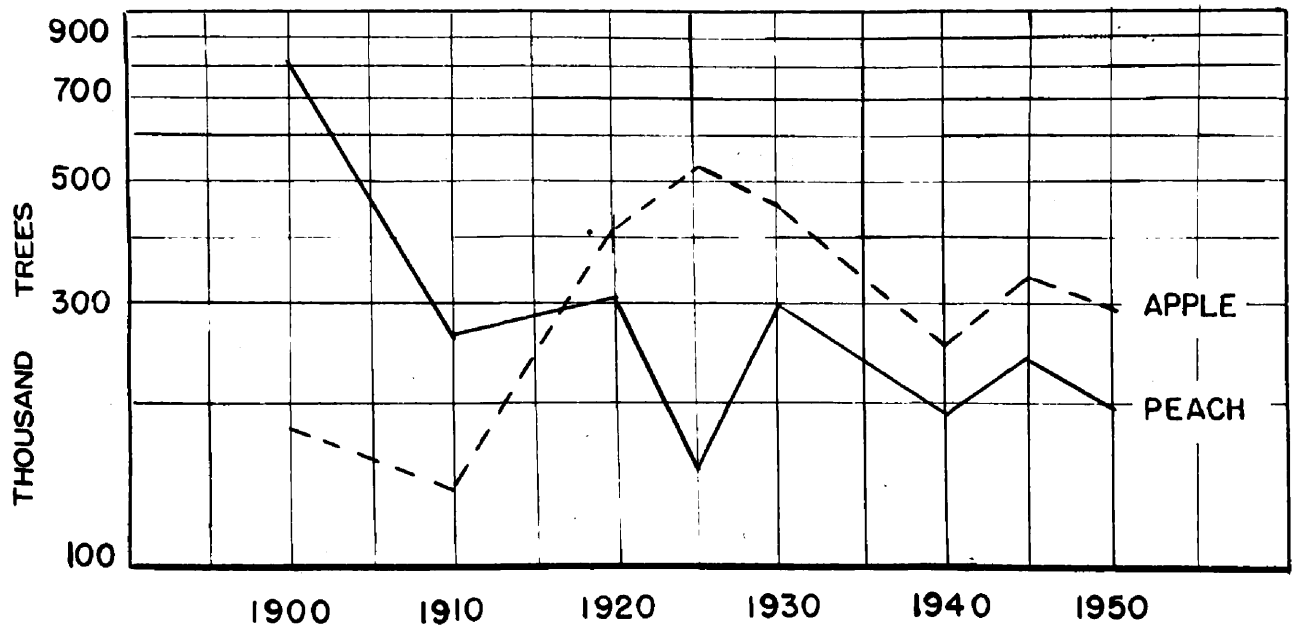
It is a generally accepted principle that the past is the foundation of the present, and the present is the key to the future. Nevertheless, any prognostication should take into consideration the possibility of future new and unexpected elements which might lead to unanticipated results. It is not likely that any permanent changes will occur in the physical factors that affect the fruit industry of Washington County. Although the economic factors have been fairly stable, fruit production and grower's returns in the future, will be deter-

mined primarily by three economic factors: cost of production, cost of marketing, and market price, unless series of very severe freezes should occur. Production cost includes such items as fertilizers, spraying materials, labor, etc. Marketing charges include transportation, storage, packing, wholesaling, and retailing costs. These costs are of primary importance to growers in any attempt to increase or maintain net returns, and, therefore, they are the major factors to be considered in determining the future of the fruit industry in Washington County. At the present time, some of the production costs and also marketing costs are determined on a regional or even national basis, rather than on a local basis, and individual growers can do little to change these factors. For instance, marketing charges for Appalachian apples and labor costs are fairly uniform.

Marketing charges amounted to a little more than three-fourths of the consumer's dollar spent for Appalachian fruits. Although any recommendation for changes in marketing methods is not within the scope of this study, the present marketing margins are very high in proportion to the grower's return. They could perhaps be reduced by creating cooperative marketing organizations. Reduced marketing expenses would definitely assure a better future for the fruit industry of the Appalachian area, through more satisfactory returns to the growers.

The fruit industry of the Appalachian area, the apple industry in particular, is faced with three opposing factors

GRAPH I TRENDS OF APPLE AND PEACH TREES IN WASHINGTON COUNTY FROM 1900 TO 1950



Source: U.S. Census Bureau.

which may well become increasingly effective until they are able to counteract all efforts to expand the fruit industry of this area.

Competition of Northwestern apples is becoming more acute in the Eastern markets such as Pittsburgh, New York, and Philadelphia. Apple production of the Northwestern States has increased during the past two decades, and this trend is likely to continue.[1] Despite the fact that the grower in the Appalachian area paid at least one dollar less per bushel of apples for shipment to Pittsburgh in the 1949-50 season than his competitor in the Northwestern States, his return was lower than that of his competitor. In this season the Northwestern grower received an average of $1.23 per bushel box at the packing-shed door for apples marketed in Pittsburgh, while the Appalachian grower realized an average of 81 cents per bushel basket. This was equivalent to twenty-four per cent of the consumer's dollar spent for the Northwestern apples, and twenty-two per cent of the consumer's dollar spent for the Appalachian apples.[2] Because of the high quality of Northwestern apples the average retail price is four cents per pound

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[1]For instance, apple production of Washington State was 28,000,000 bushels in 1940, 39,000,000 in 1945, and 40,000,000 in 1950. That of Maryland was 2,000,000 bushels in 1940 and 1,000,000 in 1950; that of Washington County 685,000 bushels in 1940, and 980,000 in 1945 and 685,000 in 1950.

[2]H. W. Bitting and Henry T. Badger, "Marketing Charges for Apples Sold in Pittsburgh, December 1949-May 1950", U. S. Department of Agriculture, Bureau of Agricultural Economics, Agriculture Information Bulletin No. 47, Government Printing Office, Washington, D. C.: June 1951, p. 10.

higher than that of Appalachian apples, 12.17 cents and 8.18 cents respectively, as an average for all varieties marketed in Pittsburgh in the 1949-50 season.[1]

Bananas and citrus fruits compete effectively against apples and peaches in all markets. Production of citrus fruits, oranges in particular, in the United States has increased tremendously, and the market price has substantially decreased. After the war bananas have been regaining their former competitive position. This situation has resulted in a definite shift to bananas, oranges, and grapefruit. Consumption of oranges in particular remains high throughout the year in all markets, as a result of low price, availability, and widespread advertising.

The trend in per capita consumption of fresh apples in the United States shows a general decline during the past three decades (50 pounds in 1920 and 30 pounds in 1950), and it is likely that this decline will continue.[2] Although per capita consumption of canned apples and apple sauce has increased since 1930 (1 pound in 1930 and 2 pounds in 1950), most of the Maryland apples are consumed fresh (45 per cent of the production was processed in 1950).[3]

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[1] Ibid., p. 2

[2] C. W. Porter, "Apple Marketing Almanac, Maryland and Appalachian States", University of Maryland, Extension Service, Misc. Extension Publication No. 11, College Park, Maryland: December 1951, p. 9, Figure 7.

[3] Ibid., p. 10, Figure 12.

Prior to World War II the annual export of apples from the United States averaged eighteen million bushels, but from 1939 on, it has dropped to two million bushels a year. The decrease in export of apples has affected the Appalachian area more than the other apple-producing areas of the United States. Future apple exports to Europe, the major importer, may decrease, because they have been financed by ECA and Section 32 funds, which are likely to be discontinued in the near future, unless a change should occur toward a more liberal American foreign trade policy.

Moderate fruit plantings in Washington County would be justified, even under the present high cost of production, provided high quality varieties are planted on good soils. Higher quality fruit will bring better market prices; and rich, deep soils will reduce the cost of production. A commercial fruit grower in the Western Division of the County stated that in the future there will be fewer trees, with greater emphasis on better quality and higher yields. Certainly these should enable growers to get satisfactory returns, despite competition with the Northwestern growers. Without the adoption of some such measures the future of the fruit industry of Washington County does not look very promising, particularly in the Western Division where soils are not rich and spring frosts are frequent.

The number of apple trees in Washington County may be expected to continue to decline in the near future. Apple production probably will remain at the present level, or slightly below that between 1950 and 1960, because in 1950 the

number of old trees, thirty years and over, was more than 70,000 and the number of young trees, six years and less in age, was lower than that figure.[1] Almost one-third of the total apple trees in 1950 were planted after 1942, and one-third were planted between 1920 and 1942. Thus within the next ten years the number of apple trees in full commercial production will offset the number of trees dropped from commercial production because of old age. Future apple production will consist mainly of red strains which have been replacing the older varieties (see Chapter IX, for further analysis).

In regard to the number of peach trees in Washington County the present decline will probably continue in the near future, because at present planned planting is lower than planned removal of peach trees. The similarity in trends in apple and peach trees since 1930 (Graph1) is likely to continue for some time. Peach production, however, will increase, because, in 1950, the number of old trees, twenty years and over, was 6,000, and the number of young trees, four years and less, was over 32,000 trees.[2] Since 1940 Washington County has outranked the other counties in the State in number of peach trees and in peach production, and indications are that it will maintain its present position in peach production during the immediate future. According to the present distribution of peach trees by age groups in Maryland the peak of

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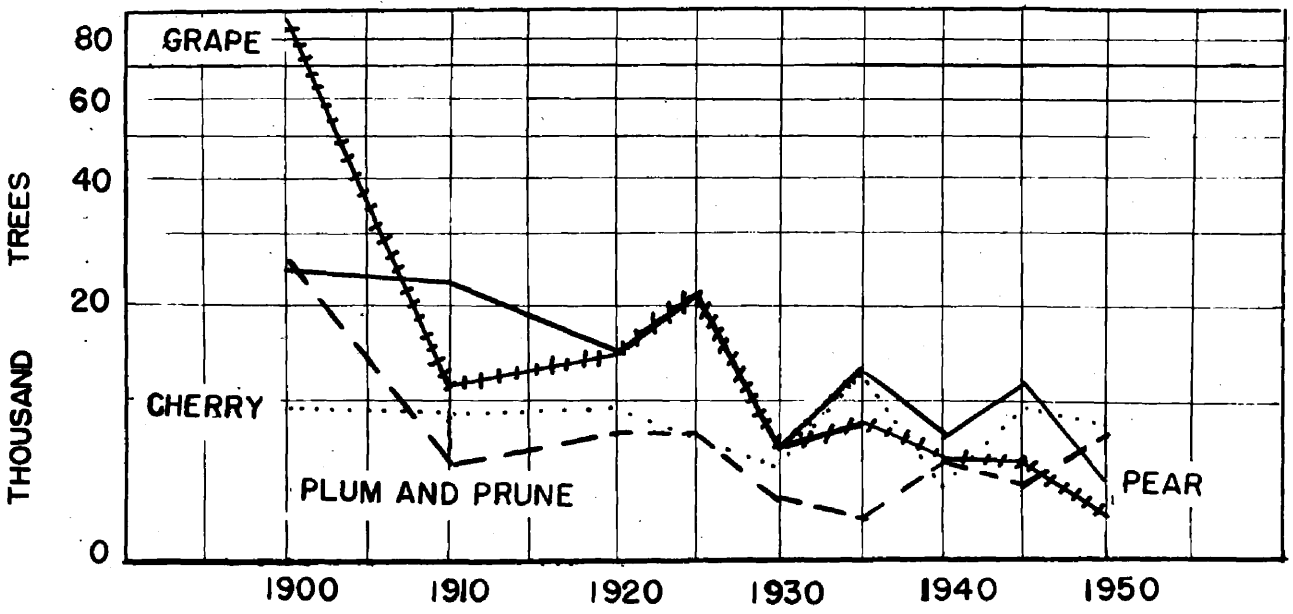
[1] C. W. Porter and A. R. Miller, op. cit., p. 13, Table 2

[2] Ibid., p. 23, Table 5

GRAPH 2 TRENDS OF PEAR, PLUM & PRUNE AND CHERRY TREES AND GRAPEVINES IN WASHINGTON COUNTY FROM 1900 TO 1950



SOURCE: U. S. CENSUS BUREAU

peach production in Washington County will be followed by a peak of production in the Eastern Shore. And because of the large number of non-bearing peach trees in Washington County, another and still higher peak of production in the County will follow that of the Eastern Shore around 1960.

Trends of pears and cherries are similar to those of apples and peaches (Graph 2).

In view of the unfavorable factors of high cost of production and decreasing market price, emphasis on high-quality fruit and higher yield could be the difference between success and failure in fruit growing in Washington County. Future markets will demand fruit of high quality for both consumers and processors. Since 1945 the growers have been eliminating the orchards which include old trees or trees of inferior varieties, in order to produce better-quality fruit at a lower cost of production.

In conclusion, there are some points which should be stressed in regard to each of the major fruit-producing divisions of Washington County, the Eastern and Western Divisions. These points are:

In the Eastern Division, where the physical conditions are more favorable for fruit growing than in the Western Division, the growers tend to concentrate on peaches rather than apples. Although there is some shifting from fruit-farming to dairying or beef-cattle farming, the Eastern Division will continue to lead the County as well as the State in peach production. Indications are that apples will remain secondary to peaches.

Canneries could become a major outlet for the peaches of this Division, if conditions in the fresh fruit market should become unfavorable. As far as suitable sites for orchards are concerned, the present fruit acreage could be doubled.

In the Western Division, concentration on smaller orchards in more suitable sites would result in more efficient management, less frost damage, higher quality fruit, and in turn, lower cost of production. Eliminating orchards located on comparatively unfavorable sites would not necessarily mean reduction in fruit acreage, because additional acreage which is now used in grains or pastures for one reason or another, could be utilized for fruit production.

Sheep-farming can be developed in this Division where land is not suitable for orchards. Two other types of farming, poultry and vegetables, especially tomatoes for canning, might be successfully developed. The farm land in the Western Division is mainly owned by a few large growers who are chiefly interested in fruit farming. The small farmers here are handicapped by lack of capital or land or both of them. Thus, the development of any type of farming other than fruit farming would require a new class of farmers or an increasing interest of the few large fruit growers in the other agricultural commodities.

CHAPTER XII

HAGERSTOWN

In the preceding chapters the physical, human, and economic elements of the geography of Washington County have been presented, with special emphasis upon the fruit industry which gives the County a unique position in the State of Maryland. The City of Hagerstown will be discussed here briefly, although a study of its industrial development and its characteristics as an urban agglomeration has been excluded from this dissertation.

Hagerstown, seat of Washington County, is located in the middle of Hagerstown Valley, six miles from Pennsylvania to the north and from the Potomac River to the south. By virtue of this location the town became a center of commercial activity from the time it was founded by Jonathan Hager in 1762.

Also because of its location in the Appalachian Valley and between the seaboard and the upper Ohio River, Hagerstown has been served by two major national highways: U. S. 40 (the old national turnpike), and U. S. 11. It is also served by four railroads: the Baltimore and Ohio, Pennsylvania (Cumberland Division), Western Maryland, and Norfolk and Western (Shenandoah Division).

The population growth of the City was steady and maintained a rate above that of the rest of the County, because of a continuous migration from the rural districts to Hagerstown

particularly during the two major periods of rapid industrial development over the past fifty years.

At present Hagerstown has grown beyond the corporate boundary, which encloses an ares of six and six-tenths square miles. The new housing developments are located mostly beyond the official city limits along U. S. 11, to the north and southwest; along U. S. 40, to the southeast; along Sharpsburg Road (State Route 65), to the south; and along Smithsburg Road (State Route 64), to the east. (Plate 9).

Hagerstown is situated in comparative proximity to the Appalachian coal field, and is served by railroads that are major haulers of coal.

Many of the manufacturing industries of Washington County are located in Hagerstown, although some are established in Williamsport (tanning and brick-manufacture), Security (cement), and Hancock (canning). The concentration of industries in Hagerstown came about chiefly because of its transportation facilities, its favorable location in relation to sources of raw materials and markets, and the availability of skilled labor.

During the 1940-50 period industrial development was unusually rapid, because of defense and post-war demands. At present, the largest single industry in the County is the manufacture of aircraft,[1] and the second largest is cement

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[1]Fairchild Aircraft Division in Hagerstown employed 4,740 workers in 1952.

Photo 20. A main street in Hagerstown, leading to the town-town. The street shows the one-way traffic which is applied for nearly all streets, because they are too narrow for present day heavy traffic which reflects the increasing significance of Hagerstown as a commercial center (courtesy of Hagerstown Chamber of Commerce).

Photo 21. A general view of one of many modern residential sections which are found in Hagerstown and vicinity (courtesy of Hagerstown Chamber of Commerce).

Photo 22. Hagerstown's modern city hall (courtesy of Hagerstown Chamber of Commerce).

Photo 23. Baugborn Park, one of Hagerstown's parks (courtesy of Hagerstown Chamber of Commerce).

Photo.24. Airview of Fairchild Aircraft Division, builder of the "Flying Boxcar". The plant is located north of Hagerstown (courtesy of Hagerstown Chamber of Commerce).

manufacturing,[1] and manufacturing of leather goods ranks third in number of employees.[2] Other industries such as the manufacture of pipe-organs, and that of blast-cleaning, dust-collecting equipment, and refrigerator doors, are small in size, but well-known. Furniture plants, timber treatment plants, silk mills, knitting mills, fertilizer plants, steel and metal fabricating plants, and garment manufacturing plants are among the other manufacturing establishments of Hagerstown. Thus, the town has widely diversified industries for which an ample supply of skilled labor is more important than raw materials.

During the early part of its history, the growth of Hagerstown paralleled the agricultural development of the County, and the development of trade. Cheifly because of its location Hagerstown became the logical center of commercial activities of the people of Washington County and adjacent areas. The town still is a leading business center not only for Washington County, but also for parts of adjacent counties and states. However, today its role as a manufacturing center is almost as important as that of a trading center.

The development of Hagerstown has had four important consequences for Washington County: first, the lack of development of other towns; second, the continuous decrease of the ratio of the rural-farm population to the total population;

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[1] Paugborn Corporation employed 730 and North America Cement Corporation 345 workers in 1952.

[2] Employed 525 in 1952.

Photo 25. Paugborn Corporation in Hagerstown, America's best known manufacturers of blast cleaning and dust collecting equipment (courtesy of Hagerstown Chamber of Commerce).

Photo 26. The world's largest pipe-organ building plant is found in Hagerstown (courtesy of Hagerstown Chamber of Commerce).

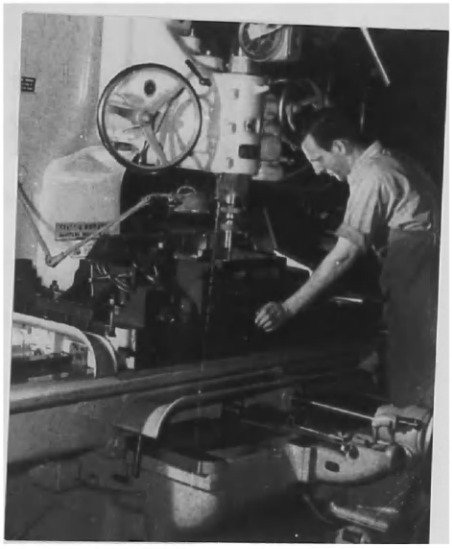

Photo 27. An expert running a complicated machine indicates the skilled labor which is needed in the diversified industry of Hagerstown (courtesy of Hagerstown Chamber of Commerce).

Photo 28. Shoe making is a major element of the well-diversified industry of Hagerstown (courtesy of Hagerstown Chamber of Commerce).

third, development of dairy-farming in Hagerstown Valley; fourth, a pronounced decrease in total land in farms.

Hagerstown would be an excellent and interesting subject for a geographical study of the development of an urban center located in a large and productive agricultural region, and of its changing relations to the surrounding area. The author sincerely hopes that in the near future one of his fellow geographers will make such a study, thus rounding out the present study of the geography of Washington County, Maryland.

SUMMARY AND GENERAL CONCLUSIONS

As stated in the "Preface", the purpose of this Dissertation is to make an intensive geographic study of a comparatively small area. Washington County, Maryland, was chosen for this study, because the author felt that it was an area of diversified physical features and diversified development, and although it is bounded to the north by a purely artificial line, it does have a certain degree of physical unity.

In order to confine the scope of the study, Hagerstown, the only significant industrial and commercial center, was treated only insofar as it affects the distribution of population and its employment, as well as the general development of the County. The fruit industry was given special consideration not because of total value of production or number of employees, but because it puts the County in a unique position in the State, and because it represents one of the major aspects of regional differentiation within the County.

Morphology, climate and soils of the County have been discussed and the relationships between each of these physical factors and areal differentiation and trends in development were brought out. These relationships were given particular consideration throughout the study, for the author believes that such relationships are important keys to a correct interpretations of the mode of life of the people and the aspects of the cultural landscape of a region. Comparisons were made between Washington County and other counties or the State as a whole, wherever it was necessary or useful. The author is

aware of the fact that Washington County, as a consequence of certain physical and economic conditions, is more closely connected with adjacent parts of the Appalachian region than with the rest of Maryland. He is also conscious of the effects of certain regional or national currents upon the development of the County, or upon a given economic condition in particular. However, the author has tried in the course of the discussion to avoid unnecessary general, or encyclopedic facts, in order to present main traits of the geography of the County.

A general summary with related conclusions may help to give the reader an overall view of content of the study and the major conclusions that were reached.

South Mountain separates Washington County from Frederick County to the east; Sideling Hill Creek marks the border with Allegany County in the west; the Mason-Dixon line forms the northern boundary; and the Potomac River the southern boundary. Thus, the County has natural boundaries of some importance on three sides: to the east, west, and south. In this respect it differs from most other counties in the State. These natural boundaries to some extent set off areas of land use, but they did not act as barriers that hindered development of the County. Roads and railroads were built connecting Hagerstown, the County seat, with all adjacent areas.

The total land area of the County is about 293,000 acres (458 square miles). Most of it, three-fifths, is in Hagerstown Valley which is a part of the Cumberland-Shenandoah Valley. The rest falls into two morphological regions, the Eastern

Highlands Region comprises less than one-fifth of the total area and includes South Mountain, Elk Ridge, and Pleasant Valley. The Western Highlands Region is part of the Ridge and Valley Province of the Great Appalachian Region, and consists of several ridges, such as Powell Mountain, Tonoloway Ridge, and Sideling Hill and intervening narrow valleys. The crests of most mountains in the County form long, horizontal lines, and average 2000 feet in height. Limestone formations underlie almost the entire Hagerstown Valley region, as well as small, scattered areas in the other two regions where shales and sandstones predominate.

Neither of the two major climatic elements, temperature and precipitation, is a limiting factor. The length of the growing-season, 155 to 175 days, is sufficient for normal growth of crops. Actually, what is important here, particularly in relation to fruit production, is not so much the length of the frost-free season, nor the mean annual temperatures, but the absolute minimum and mean minimum temperatures. Both are lower in the Valley than in the other regions. Thus climatic conditions, as well as land forms in Hagerstown Valley generally are not favorable for fruit growing.

Because of the variation in land forms, bedrock and marble rock in the County, soils differ considerably. Those of Hagerstown Valley are developed primarily from limestone, and are deep, medium to heavy-textured, moderately permeable, with high available moisture capacity and inherent fertility. Those of the other regions, the Western Highlands in particular, are

derived mostly from shales and sandstones and are moderately deep to shallow, well drained, moderately to poorly permeable, and have moderate to low inherent fertility, and moderate to low available moisture capacity. Thus, almost all of Hagerstown Valley is productive, suitable for use of agricultural machinery, and favorable for growing grains and pasture crops, while in the Highland regions areas with steep slopes and shallow or stony soils, mainly covered with forests predominate. The areas suitable for orchards or for production of grains and hay are limited in extent.

The development of the County began as early as 1734 when the first white settlement was established at the confluence of Conococheague Creek and the Potomac River by Scotch-Irish. These pioneers were soon followed by Germans who settled in the central part of Hagerstown Valley. Among them was Jonathan Hager who laid out the core of the present city of Hagerstown in 1762. It was not until 1776, however, that the County was established. Because of poor transportation facilities, development of the County was slow and confined to the Valley until the 1820's. After that, the rate of development increased for two reasons: (i) the remarkable influx of people into the area; and (ii) the building of roads and later of railroads which opened the County to the increasingly important trade between the sea-ports and the interior regions (back-country). From that time on Hagerstown was at a crossroads of commerce.

Reports of the United States Census Bureau, from 1790 to 1950, show that the population of Washington County increased

continuously; it is the only county in the State which maintained this trend for such a long period of time. Actually, the industrial and commercial development of Hagerstown contributed most toward maintaining the steady increase in the total population of the County during later decades. In fact, the development of the County as a whole reflects primarily the industrial and commercial expansion of Hagerstown, particularly since about World War I.

At present almost fifty per cent of the people of Washington County live in Hagerstown, and are engaged in non-agricultural activities. Another thirty-five per cent of the people, classified in the United States Census Bureau report of 1950 as rural non-farm, are engaged mostly in non-agricultural occupations, of which Hagerstown is the center. This means that less than one-fifth of the people of the County tills the soil to produce grains or fruits, and to raise cattle, sheep, hogs, or poultry. Accordingly, density of population is far greater in the districts into which Hagerstown expanded and in the adjacent districts than in the more distant ones such as Hancock District in the west, and Sandy Hook and Rohrersville Districts in the east. It should be noted, however, that the districts comparatively remote from Hagerstown are mountainous and lack natural resources for intensive development. Inasmuch as there are no present indications of important changes in the pattern of population distribution and in the trends of economic activities within the County it seems likely that conditions in Washington County

will remain essentially the same for some time to come.

An overwhelming majority of the eighty thousand people living in Washington County at present are white and native-born citizens. The non-white, four per cent of the total population, live mostly in Hagerstown and are engaged in non-agricultural activities. In this regard, Washington County resembles the other counties of Western Maryland, i.e., Allegany and Garrett. The non-whites in Maryland live mainly in Baltimore City, the Eastern Shore, and Southern Maryland, where they are engaged in non-agricultural and agricultural activities. No substantial change is likely to occur in the present racial composition of the people of the County, although there may be some increase in the non-white population as a result of the development of industry in Hagerstown.

The turn of the nineteenth century marked a fundamental step toward the development of the present agricultural pattern of Washington County. Prior to the present century Hagerstown Valley was used mainly for growing wheat and corn for cash. Other grains, oats, rye, buckwheat, and barley were produced as secondary crops and used for feed. Fruits were insignificant, although actual figures for production and number of trees are not available. After 1900 there was a substantial decrease in wheat acreage and a pronounced increase in acreage of barley. These changes in grain production are related chiefly to the increasing significance of dairying and beef-cattle farming. Fruit acreage increased in

both the Eastern and Western divisions. In 1925 the County took the leadership in Maryland in production of apples and peaches. The material growth in the population of Hagerstown was a major factor in the development of dairy, beef-cattle, and poultry farming in Hagerstown Valley. During the past two decades dairying and beef-cattle farming increased in importance in the Eastern Division, where physical conditions are suitable for dairying or beef-cattle farming, as well as for fruit. The Western Division remained important only in fruit production.

The areal distribution of the various types of farming in the County and the factors responsible have been discussed. From the point of view of land use the County can be divided into three divisions. The Eastern Division coincides mostly with the Eastern Highlands Region. Fruit farming is predominant in the Ringgold and Cavetown Districts, and mixed farming dominates the remainder of the division. Mixed farming, as the term is used here, indicates that at least two major crops are produced on practically every farm, usually fruit and milk or beef. Peaches are predominant in the orchards of this division. In the Central Division dairying and beef-cattle farming are predominant. Most of the livestock products are shipped to Hagerstown, although milk from this Division is also shipped into Pennsylvania, to Waynesboro and Hershey. General farming is practiced in the southern part of the Division, where more than two major crops are produced on practically every farm, although livestock products still have priority. In the Western

Division farming is predominant. Apple trees are three times as numerous as peach trees. General farms found in the Division are significant from dollar value and acreage standpoints.

Forests occupy most of the slopes of the mountains in both the Eastern and Western Divisions, where land is too steep and soil too shallow for cultivation. The commercial usage of these forests is insignificant. There was a decrease in acreage of farm land in the County during the 1940-50 period, because of the movement of people from farming areas to Hagerstown.

Dairying and beef-cattle farming are the most significant types in the County as far as number of people engaged, cash value, and acreage are concerned. The development of these types has been closely related to the growth of the population of Hagerstown. A small part of the southeastern portion of the County is within the milk-shed of Baltimore, but no milk may be shipped into Washington, D.C., because of certain sanitary regulations. Further development of dairying in Washington County would require two significant changes: (1) adaptation of the sanitary practices on dairy-farms in order to meet the regulations of the Washington, D.C. milk-shed; (2) the development of farm marketing cooperative organizations. Only a very few milk producers here belong to cooperative Pennsylvania organizations.

The raising of beef-cattle could be expanded, particularly if emphasis is placed on breeding rather than feeding, as this would be more profitable in Washington County. At present, all

indications point toward increasing significance of dairying and beef-cattle farming in the Eastern Division. The possibilities for developing dairy or beef-cattle farming in the Western Division are limited, because of unfavorable physical factors, although there is more land available there which could be devoted to this type of farming than is now so used. In this Division concentration on fruit farming can be maintained, with sheep farming as an important secondary activity. Raising sheep is at present relatively unimportant in the County, but it can be expanded in the Western Division, where conditions are favorable. Although figures for distribution of sheep by districts are not available, it is obvious from observation that most of the sheep of the County are raised in the Western Division .

During the past decade there has been a remarkable decrease in the number of horses and mules, and an increase in the number of motortrucks and tractors used on farms. The all-weather roads which serve the farming areas, have contributed a great deal to the general agricultural development of the County, particularly dairy farming. Further improvement of the County's roads is needed in many sections where stony or dirt roads are still found.

Washington County ranks first in apples and peaches in the State. Other fruits, such as plums, grapes, and cherries, occupy a minor position from the standpoints of acreage, production, and dollar value. The significance of fruit from a cash value standpoint is second to livestock and livestock products. Essentially, the fruit industry of Washington County

was established because of certain favorable physical and economic factors, such as land form, climate, location in relation to market, etc. These factors have been analyzed, but it should be stated here that physical conditions in Washington County are not optimum for fruit growing. Fruit trees are planted, however, in areas where fruit production is more profitable than that of other crops. However, in some sections of the Western Division fruit growing is not economical because of poor soils and frequency of frosts damage. In these sections it might be more profitable to use the land for other purposes, such as raising sheep or beef-cattle farming.

The present pattern of distribution of types and varieties of fruits in the County reflects the suitability of certain areas for one kind of fruit rather than another. For instance, fruit trees are concentrated in two major areas: the Ringgold-Cavetown area and the Hancock area. Peaches are mainly produced in the former area where physical conditions are favorable for peach trees. In the latter area, conditions are more favorable for apples than peaches. This pattern is likely to remain the same in the near future, and the areal concentration on one kind of fruit rather than other may become more pronounced.

The future of the fruit industry, if present conditions continue, seems somewhat uncertain. Consequently, fruit growers in order to insure a satisfactory return should work effectively to: (i) reduce cost of production; (ii) grow better quality

fruit; and (iii) improve marketing methods. These aims could be obtained if: (i) unprofitable orchards are eliminated; (ii) new plantings are confined to better varieties and carefully selected sites; and (iii) organizations are formed to reduce the marketing margins.

The role of Hagerstown in the economy of Washington County has become increasingly important. The influence of the City upon the distribution and economic activities of the people of the County has been mentioned. Location has contributed much to the development of Hagerstown.

No substantial changes in the present economy of Washington County are expected to occur in the near future. It is likely that a large proportion of the increasing population of the County will remain engaged in non-agricultural activities; that more industries will be established in the Hagerstown area; and that increased acreages will be devoted to dairying and beef-cattle farming. Already it may be said that it is no longer fertile farm land, but rather industry and commerce that are the principal foundations of the economy of Washington County, Maryland.

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APPENDIX A

COMPREHENSIVE QUESTIONNAIRE

Comprehensive Questionnaire For A Geographical Study of Washington County, Maryland

1. Name _____
2. From which extraction are you _____
3. Where were you born _____
4. How long have you been in this section _____
5. From where did you come to this section _____ and why ___
6. How large is your family _____
7. Where do you and your family do most of your shopping ____
8. Do you travel to other parts of the State or to other States _____
9. Are you satisfied with your business in this section _____
10. Do you want to make any change in your present condition _ and to what _____
11. Do you want to move to another section _____another county _____ another state _____
12. Are there any sort of social or economical problems confronting you _____
13. Are you the owner _____ partly _____tenant __
14. Do you pay the rent in money or in produce _____
15. How large is your farm _____
16. How many acres do you have in cropland _____ pasture ___ woods _____
17. Do you hire labor _____ full time _____ part time _____ season _____
18. From where do you get the helping labor _____
19. Do you have any difficulty in getting this labor _____
20. What are your main cash crops _____
21. Are they the same for many of the farmers of this section _
22. What are the other crops that you grow _____
23.

Crops	Acres	Crops	Acres

24. Your rotation covers how many years and includes _____
25. Are you planning to change the rotation ___ why _____
26. Do you use the chemical fertilizers _____ what _____ and how much per acre _____
27. How much does the acre cost in this section, cropland ____ pasture _____ woods _____
28. Do you have any soil problems _____
29. Are you taking care of this type of problem _____
30. Do you get assistance, technically or financially from some agencies _____
31. Do you have any trouble with gullies or erosion _____
32. Which soil conservation practices do you use _____

Diversion terraces	_____	Crop terraces	_____
Contour planting	_____	Pasture improvement	_____
Storage ponds	_____	Reforestation	_____
Cover crops	_____	Perennial pasture	_____

33. Has a complete conservation farm plan been made for this farm
34. Do you have any drainage problems
35. What do you do for such problems
36. Do you raise any livestock dairy cows beef cattle Hogs sheep
37. How many gallons of milk do you produce daily to where do you ship it which grade is it
38. What are your milk products
    To where do you ship them
39. How do you finance your dairy business
40. Do you have any sort of complaint, regarding this business What are the solutions
41. Do you raise chickens Turkey
42. Do you produce eggs number per day
43. To where do you ship your production daily or weekly
44. Do you want to enlarge your poultry production why
45. Do you grow your own feed needs What are they
46. Do you belong to a cooperative marketing organization
47. Do you think farmers here need more cooperative activities

FRUIT INDUSTRY

48. How many acres do you have in orchards
49. What are the fruits you grow
50. What is the average production per year: apples peaches cherries others
51. Are you satisfied in the present condition of this industry if not, what do you expect
52. What is your plan for the immediate future
53. What are the varieties of apples that you grow
54. What are the varieties of peaches that you grow
55. Do you have any plan for shifting from one crop to another why
56. Do you expect any change in production in the future why
57. How do you ship your products
    private owned truck
    transportations companies
    trains
58. Do you have any problem concerning shipping
59. Do you have any problem, concerning marketing
60. Do you get any assistance or advice from any County, State or Federal agencies? if "yes" what kind is it ?
    Do you think it should be more
61. What is the fertilizer that you use
62. How much per acre
63. Do you have any labor problem

64. From where do you draw your labor _____
65. Do you have storage facilities _____ canning _____
cider _____ others.
66. Where do you sell your products _____ Hagerstown _____
other towns _____ cities _____
Which varieties have better markets in different centers _
_____

APPENDIX B

CLIMATOLOGICAL DATA

Table 1 - Chewsville

	J	F	M	A	M	J	J	A	S	O	N	D
					Temperatures in degrees Fahrenheit							
Mean daily	31	31	41	50	61	70	74	72	65	54	43	33
Mean of daily maximum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean of daily minimum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean daily range	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean monthly	31	31	41	51	61	70	74	72	66	55	43	33
Mean of monthly maximum	40	41	52	63	73	81	86	83	78	67	54	42
Mean of monthly minimum	22	22	30	39	49	58	62	61	54	42	33	24
Mean monthly range	18	19	22	24	25	23	24	22	24	25	21	18
Absolute maximum	77	76	88	94	96	100	103	104	99	95	78	70
Absolute minimum	-27	-20	- 7	9	23	30	42	39	25	19	- 4	-13
					Precipitation in inches							
Average precipitation	2.74	2.17	2.97	2.96	3.53	3.95	3.79	3.86	3.09	2.98	2.24	2.62
Greatest precipitation	6.07	4.44	6.99	6.18	7.12	11.57	10.28	8.61	7.51	10.63	5.45	5.83
Least precipitation	0.92	0.34	0.08	0.65	0.63	0.70	0.69	0.64	0.38	0.24	0.28	0.41
Average snowfall	8.6	7.9	5.2	1.1	T				T	0.1	0.9	4.8
Average No. of days 0.01" or more	9	8	10	10	11	11	10	10	8	8	8	9
Average No. of clear days	10	10	11	11	12	12	12	12	14	15	10	9
Prevailing wind direction	NW	NW	NW	NW	NW	SW	SW	SE	SE	NW	NW	NW

1/ Data not available

Source: See Chapter IV, Page 45.

Table 2 - Clear Spring

	J	F	M	A	M	J	J	A	S	O	N	D
Temperatures in degrees Fahrenheit												
Mean daily	31	31	41	51	62	69	74	79	66	54	43	33
Mean of daily maximum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean of daily minimum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean daily range	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean monthly	31	31	41	51	62	69	74	72	66	55	43	33
Mean of monthly maximum	40	40	52	63	74	81	86	84	78	66	53	41
Mean of monthly minimum	23	22	31	40	50	58	63	61	55	43	34	24
Mean monthly range	17	18	21	23	24	23	23	23	23	23	19	17
Absolute maximum	81	77	90	94	95	102	107	106	102	95	82	70
Absolute minimum	-16	-15	5	17	30	33	42	40	31	19	-4	-6
Precipitation in inches												
Average precipitation	3.13	2.63	3.51	3.63	3.84	4.13	4.09	4.21	3.08	3.09	2.39	3.14
Greatest precipitation	6.04	5.66	7.27	12.99	7.70	11.01	8.12	9.76	8.86	10.05	6.19	7.03
Least precipitation	1.05	0.29	0.71	0.98	1.10	0.98	0.20	1.13	0.61	0.42	0.50	1.00
Average snowfall	9.6	9.5	7.0	1.5	T					0.2	1.0	6.0
Average No. of days 0.01" or more	9	9	11	10	11	11	10	10	8	7	8	9
Average No. of clear days	11	11	12	12	13	15	15	13	15	16	12	11
Prevailing wind direction	W	W	W	W	W	W	W	W	W	W	W	NW

1/ Data not available

Source: See Chapter IV, Page 45.

Table 3 - Hancock

	J	F	M	A	M	J	J	A	S	O	N	D
Temperatures in degrees Fahrenheit												
Mean daily	29.8	1/	1/	1/	1/	1/	1/	72.9	67.3	55.0	43.6	33.3
Mean of daily maximum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean of daily minimum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean daily range	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean monthly	30	30	42	52	63	71	75	73	67	55	44	33
Mean of monthly maximum	38	41	54	66	78	85	89	86	81	70	55	44
Mean of monthly minimum	21	19	30	38	48	57	61	60	52	41	32	23
Mean monthly range	17	22	34	28	30	28	28	26	29	29	23	21
Absolute maximum	73	79	91	97	101	102	106	103	103	94	81	72
Absolute minimum	-17	-18	-4	7	21	34	42	38	24	19	12	-6
Precipitation in inches												
Average precipitation	2.62	2.12	3.13	3.08	3.46	4.04	3.49	3.20	2.87	3.22	2.28	2.58
Greatest precipitation	5.48	4.70	7.86	8.18	7.28	8.66	6.90	7.83	6.84	9.68	5.70	5.69
Least precipitation	0.98	0.27	1.17	0.64	0.77	2.20	0.14	0.48	0.13	0.47	0.34	0.60
Average snowfall	7.9	7.4	5.2	0.9	T					0.2	0.7	4.6
Average No. of days 0.01" or more	9	8	10	10	11	10	10	8	8	7	7	8
Average No. of clear days	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Prevailing wind direction	W	W	W	W	W	W	W	W	W	W	W	W

1/ Data not available

Source: See Chapter IV, Page 45.

Table 4 - Keedysville

	J	F	M	A	M	J	J	A	S	O	N	D
Temperatures in degrees Fahrenheit												
Mean daily	32	33	43	52	63	70	76	74	70	56	45	34
Mean of daily maximum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean of daily minimum	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean daily range	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Mean monthly	32	33	43	53	63	72	76	74	68	56	45	34
Mean of monthly maximum	42	43	55	66	77	84	88	86	80	69	55	43
Mean of monthly minimum	23	23	32	40	50	59	63	62	55	44	34	26
Mean monthly range	19	20	23	26	27	25	15	24	25	25	21	17
Absolute maximum	78	79	91	97	100	104	107	109	103	98	81	70
Absolute minimum	-26	-19	0	10	27	34	42	40	28	20	-4	-15
Precipitation in inches												
Average precipitation	2.85	2.30	2.88	3.19	3.45	3.83	3.93	4.03	3.21	3.26	2.35	2.82
Greatest precipitation	6.07	4.20	5.68	6.78	6.72	7.20	11.66	8.98	6.87	10.26	6.09	6.77
Least precipitation	0.91	0.16	0.37	0.69	0.73	1.28	0.18	0.90	0.45	0.32	0.33	0.51
Average snowfall	7.7	7.7	4.4	0.8	T					0.1	0.6	4.9
Average No. of days 0.01" or more	3	3	2	0								2
Average No. of clear days	12	12	14	14	15	16	17	17	18	17	14	12
Prevailing wind direction	NW	NW	NW	NW	S	S	S	S	S	NW	NW	NW

1/ Data not available

Source: See Chapter IV, Page 45.

APPENDIX C

COMPARATIVE DATA OF LEADING COUNTIES IN FRUIT IN MARYLAND

TABLE 1. Apples--Changes in Number of Farms and Trees per Farm in Four Leading Counties Between 1929 and 1949

	Allegany		Washington		Frederick		Wicomico	
	Farms reporting	Trees per farm	Farms reporting	Trees per farm	Farms reporting	Trees per farm	Farms reporting	Trees per farm
1929	746	193	2,081	215	2,452	66	686	66
1934	822	154	1,575	212	2,534	56	126	15
1939	654	170	1,191	213	1,337	66	53	174
1944	212	303	1,337	251	668	107	59	131
1949	545	99	607	489	721	79	215	52

Source: U. A. Census Bureau

TABLE 2. Peaches--Changes in Number of Farms and Trees per Farm in Four Leading Counties Between 1929 and 1949

	Washington		Frederick		Carroll		Wicomico	
	Farms reporting	Trees per farm	Farms reporting	Trees per farm	Farms reporting	Trees per farm	Farms reporting	Trees per farm
1929	636	461	1,137	48	1,060	27	489	66
1934	553	421	1,190	44	1,004	27	62	457
1939	388	490	664	68	550	31	24	1,748
1944	713	331	364	147	537	22	48	503
1949	340	576	379	103	312	71	151	383

Source: U. S. Census Bureau

APPENDIX D

HISTORICAL SITES

Photo. 1. Burnside's Bridge for which the forces of General McClellan fought the Confederates of General Lee in 1862. This Bridge is found on the Antietam Creek, less than a mile southeast of Sharpsburg. (Courtesy of Hagerstown Chamber of Commerce)

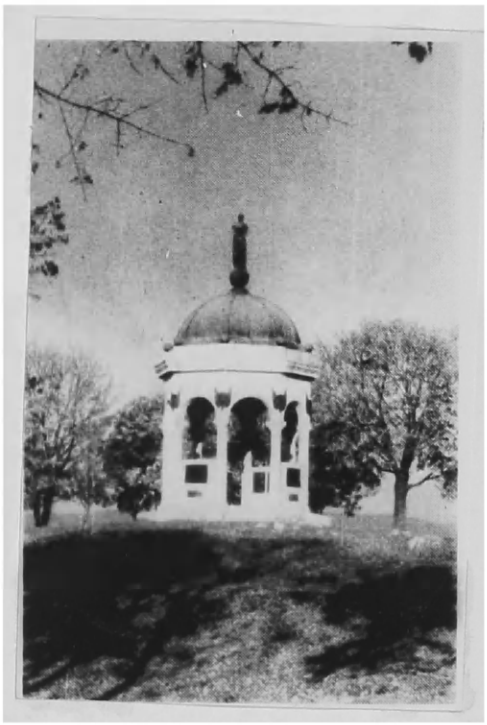

Photo 2. Maryland Monument, the only one of its kind in the world, was erected by the State in the memory of her sons who fought the Civil War on both sides. It is located on the Antietam Battlefield, across Sharpsburg Road from Dunkard Church, a mile north of Sharpsburg. (Courtesy of Hagerstown Chamber of Commerce)

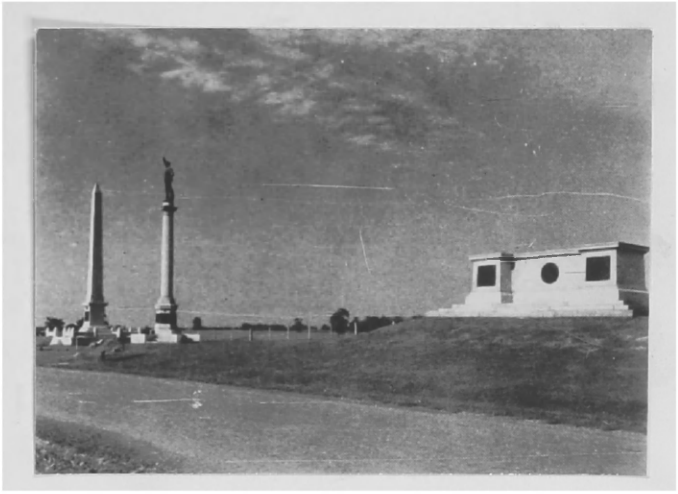

Photo 3. A scene from the Antietam Battlefield, along Sharpsburg Road and near the Bloody Lane. The photograph shows a few of the numerous monuments and markers found in the Battlefield which is today a National Park. (Courtesy of Hagerstown Chamber of Commerce)

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MAP
OF
WASHINGTON COUNTY
SHOWING THE
TOPOGRAPHY
AND
ELECTION DISTRICTS

STATE OF MARYLAND
DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES
JOSEPH T. SINGEWALD, JR. DIRECTOR
IN COOPERATION WITH
U. S. GEOLOGICAL SURVEY
WILLIAM E. WRATHER, DIRECTOR

1944

Scale of Miles

Contour interval 20 feet.
Datum is mean sea level.

CONVENTIONAL SIGNS

CULTURE
(printed in black)

Transcontinental line; Cities and villages; Towns and buildings; Principal and secondary roads; Trails; Railroads; Double-track railroads; Town railroads; Tunnels; Bridges; Ferries; Fords; Dams; Levees; State lines; County lines; District lines; Triangulation stations; Bench marks

RELIEF
(printed in brown)

Figures (showing heights above mean sea level, determined accurately); Contours (showing heights above mean sea level, determined approximately and dependent upon the accuracy of the contours); Depression contours; Cliffs

WATER
(printed in blue)

Streams; Falls and rapids; Intermittent streams; Canals and ditches; Aqueducts; Lakes and ponds; Fresh marshes

Surveyed 1898-1910. Culture revised 1944 by Ernst Cloos

Culture revised, Eastern part, 1940

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